

# South East Europe Regional Infrastructure Program



## **C-15: Kostajnica, Croatia Water Utilities Financial Statements and Projections, and PSP Options Analysis**

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Booz | Allen | Hamilton

## Abbreviations and Acronyms

BAH	Booz Allen Hamilton
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
EBRD	European Bank For Reconstruction and Development
EU	European Union
FDI	Foreign Direct Investment
FY	Fiscal Year
HBOR	Hrvatska Banka za Obnovu I Razvitak
HRK	Croatian Kuna (Currency)
HV	Hrvatska Voda
GFS	Government Financial Standards
GOC	Government of Croatia
IAS	International Accounting Standards
IMF	International Monetary Fund
IP3	Institute for Public-Private Partnerships, Inc.
IPH	Institute for Public Health
IPO	Initial Public Offering
Km	Kilometers
ℓ	Liter
LGU	Local Government Unit
m	Meter
mg	Milligrams
MEPPP	Ministry of Environmental Protection and Physical Planning
MOF	Ministry of Finance
MTEF	Medium Term Economic Framework
NA	Not Applicable
NATO	North Atlantic Treaty Organization
NGOs	Non Government Organizations
O&M	Operations and Maintenance
OECD	Organization for Economic Co-operation and Development
PPP	Public-Private Partnership
PSP	Private Sector Participation
RIP	Regional Improvement Program
s	Second
SAA	Stabilization and Association Agreement
SOW	Scope of Work

TOR	Terms of Reference
UFW	Unaccounted-for Water
USD	United States Dollar
USAID	United States Agency for International Development
WB	World Bank
WTO	World Trade Organization
VAT	Value Added Tax
ZOV	Zagrebacke Otpadne Vode

### **Currency Conversion**

1 HRK =	0.16349 USD
1 € =	1.19 USD

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## Executive Summary

Under the United States Agency for International Development's Regional Infrastructure Program (RIP), Booz Allen Hamilton (BAH) was asked to develop a business plan for “Komunalac” water utility in Croatia and evaluate the potential for private sector participation (PSP) in the provision of water services in Kostajnica. The scope of this work entails providing basic financial analysis of the existing utility in order to assess the financial viability of its water operation and the adequacy of its tariff structure in order to develop a five-year business plan, and analyzing the options for PSP. This work was carried out with a multidisciplinary team composed of foreign and local experts. This report has three (3) primary objectives: i.) To review the basic financial and institutional status of the water utility; ii.) To develop a medium-term financial forecast generating conclusions in terms of water sector financial solvency, ability to finance investment and requirements to adjust tariffs over the next five-years for the water utility; and iii) To evaluate the options for PSP in the provision of water services and recommend the preferred option(s). Findings and conclusions include:

Komunalac is a small operation serving a population of approximately 9,000 persons (or, about 1,780 total connections with 1,056 household metered connections and 24 metered business connections).

- Local consumption of water has increased by less than 1% per annum on average (since the end of the war in 1995). According to the E.A. Inspekt engineering study (December, 2002) the existing water supply system is more than sufficient to satisfy current and future demand.
- The primary obstacle confronting the utility is that the size of one of its reservoirs is too small. The small size of the reservoir relative to the needs of the community creates an operating environment where the utility is forced to continuously pump water into the pipeline network system.
- The continuous pumping of water into the network results in substantially elevated pressure levels in some parts of the system (and, pipes frequently burst). Following construction of the new reservoir at Panjic, the utility expects water pressure levels to drop to more normal levels and that technical system losses will be reduced from their current 70% to 80% level(s), to around 40%.
- Komunalac’s financial statements indicate that the company has suffered substantial losses over the past few years. In 2002, the utility’s total delivered

water sales amounted to an estimated HRK 524,023 (USD 74,860), a 4% decline from fiscal year 2000.

- Meter maintenance and connection fee revenues managed to increase by more than 100% from fiscal year 2000, reaching USD 69,280 in 2002. Nevertheless, Komunalac posted substantial losses. Total company losses averaged HRK 514,790 (USD 73,541) per annum over the past three years.
- Under BAH's base case scenario (with water loss rates approaching 40%), Komunalac's financial position would improve over the medium term. However, Komunalac would continue to run substantial deficits throughout the forecast period.
- We modeled Komunalac operational and financial performances under a number of different circumstances and scenarios. As a result of these stress tests, the break even level of household and business water consumption tariff under the current meager 20-30% level of collections was estimated, respectively, at 20 and 21 HRK/m<sup>3</sup>. Obviously, this break-even tariff level is not politically or economically sustainable or viable.
- Komunalac must increase its level of water bill collections if it is to restore financial solvency. Indeed, if it were to achieve a more normal water collection revenue rates of about 90-95%, (breakeven) water household and business tariffs would have to increase, respectively, to only HRK 6 and HRK 7/m<sup>3</sup>.
- Komunalac should explore the possibilities for outsourcing functions that are not core ones to the provision of water and wastewater services as part of a larger strategy to horizontally unbundle its organizational structure. Specifically, it should assess the options for PSP in the maintenance of the produce market and in solid waste services.
- Komunalac should continue to explore the options for a regional solution to wastewater treatment. A BOT arrangement for a greenfield wastewater treatment facility would be one possible solution if Komunalac were able to secure the cooperation of the utility in Bosinska Konstajnica or in other surrounding areas.

## **I. Introduction**

Under the United States Agency for International Development's Balkans Regional Improvement Program (RIP), Booz Allen Hamilton (BAH) was asked to develop a business plan and evaluate the options for PSP for the service provider JP "Komunalac" d.o.o. Kostajnica. The RIP project aims to develop, through the implementation of basic water leakage detection work, future investment requirements and associated business plans for municipal water utilities whose distribution networks have been damaged during the war and whose customer base have shrunk due to population displacement.

The scope of this work entails providing basic financial analysis of the existing utility in order to assess the financial viability of its water operation and the adequacy of its tariff structure in order to develop a five-year business plan. This is complimented by an analysis of the means and ways for the utility in Kostajnica to lower its operating costs as well as finance its investment needs through PSP. This work was undertaken with a multidisciplinary team composed of foreign and local experts. This report has three (3) primary objectives: i) To review the basic financial and institutional status of the water utility; ii) To develop a medium-term financial forecast generating conclusions in terms of water sector financial solvency, ability to finance investment and requirements to adjust tariffs over the next five-years for the water utility; and, iii) To evaluate the options for PSP in the provision of water services and recommend the preferred option(s).

Excluding this brief introductory section, this report is divided into nine (9) sections. The second section provides a brief overview of underlying political, economic, and legal climate in Croatia, as well as the experience to date with PSP. The third section is an overview of the water sector in Croatia, including descriptions of the roles and responsibilities of key institutions as well as the regulatory framework at the national and local levels. Section four provides an analysis of the water sector in Kostajnica, including the utility's recent economic performance and operating environment. The fifth and sixth sections provide an analysis of Komunalac's financial performance as well as future financial projections. The seventh and eighth sections contain a description of the options for PSP and an outline of the recommended option(s) for Kostajnica. Finally, the last section details the recommended next steps based on the financial analysis and PSP options evaluation.



## II. Overview

### II.1 Croatia Economy and Political Climate

When it assumed office in early 2000, the administration of President Stipe Mesic took a number of steps to liberalize trade and prices, integrate Croatia's economy with the international markets, liberalize the infrastructure sector, and address corruption and cronyism in the public sector. In its bid to internationalize Croatia's economy, the country has become a member of the World Trade Organization (WTO), submitted its application for membership in the European Union (EU)<sup>1</sup>, and joined NATO's Partners for Peace Program. A key part of the economic reform process has been the introduction of PSP, and the government has been highly successful in privatizing the financial services and telecommunications sectors.

The result of these reforms has been an improving economic climate. In 2000, the economy emerged from years of war and post-war contraction and grew by 2.9%, a figure that increased to 3.8% in 2001. At the same time, inflation declined from 6.2% in 2000 to 4.9% in 2001.<sup>2</sup> Despite the gains realized from economic growth and reduced inflation, the economy still suffers from the country's high fiscal deficit, which represents 7% of GDP.

After its initial success, the process of reform in Croatia slowed in 2002 when members of the ruling coalition began to disagree on key policy decisions. As a result, President Mesic stepped down in July 2002 and Prime Minister Ivica Racan assumed the country leadership. The Racan administration took office with a mandate to reduce the size of the public sector, while at the same time reducing unemployment and forging ahead in the reform process as a lead-in to parliamentary elections in late 2003.

Unemployment, currently estimated at 15.8%, is a major problem in Croatia today. As a result, the public sector is unduly large and employment protections are stringent. It is unlawful for employees to be dismissed due to their age or health, and in cases of lawful dismissal, the length of notice period and severance requirements are substantially higher than the EU average.<sup>3</sup> Sixty four percent of laborers in Croatia are unionized, and the unions are independent of both government and political parties.

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<sup>1</sup> This follows Croatia's earlier signature of a Stabilization and Association Agreement (SAA) with the EU.

<sup>2</sup> "Strategy for Croatia," European Bank for Reconstruction and Development. 19 November 2002, p. 4.

<sup>3</sup> Employees who have worked for an employer for 20 years or more must be given up to 6 months notice and severance pay equating to 10 months salary (EU average is 4.9 months and 3.7 months respectively). "Strategy for Croatia," European Bank for Reconstruction and Development. 19 November 2002, p. 13.

## II.2 Croatia Legal Environment

Croatia's legal environment is typical of a country making the transition from a state-controlled to a market economy. While certain commercial laws – such as those governing bankruptcy – are advanced by regional standards, in other areas the legal framework is lacking. As a result, the pace of foreign direct investment in Croatia has been slow.

The Government of Croatia (GOC) has taken a number of steps to reform the legal environment, including:

- Passing a new law allowing international arbitration;
- Acceding to international anti-corruption instruments and mechanisms, including the Council of Europe Convention on laundering, search, seizure, and confiscation of the proceeds of crime, the Criminal Law Convention on corruption, and the UN Convention against Transnational Organized Crime;
- Establishing an Office for the Fight Against Corruption and Organized Crime;
- Introducing a new public procurement law in line with EU standards.

While the ongoing legal reforms have strengthened the structure of Croatia's legal system, the judicial system is still weak and confidence in the courts is lacking. To address this problem, the government has made reform of the courts system one of its top priorities and appointed a new Minister of Justice in 2001 and a new Chief State Prosecutor in 2002.

## II.3 Experience with PSP

Croatia's experience with PSP is relatively recent. Privatization revenues, however, have been an important source of financing for the government.<sup>4</sup> Under the guidance of the Croatian Privatization Fund, between 2000 and 2002 the GOC divested its holdings in the financial services and telecommunications sectors as well as in a number of small and medium enterprises it had taken over during the war.<sup>5</sup>

In the roads sector, a concession has been awarded for the construction of an Istrian highway to Bina-Istra, a consortium 51% owned by Bouygues of

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<sup>4</sup> In 2001, over 50% of the government's financing requirements were met through the proceeds from privatization.

<sup>5</sup> In many cases, a majority share in existing banks – such as PBZ and Slavenska Banka – was sold.

France and 49% by the GOC, and negotiations are ongoing for the award of a concession to upgrade the highway between Zabok and Macelj.

New energy laws provide for the introduction of PSP in the gas, oil, and electric power sectors. Under these laws, the GOC has made progress in the partial privatization (through a sale of 25% plus one share) of INA, the gas distribution monopoly. And soon HEP – the Croatian electric power company – will be divided into generation, transmission and distribution units under the control of an asset holding company, of which a 15% ownership share will be sold through an initial public offering (IPO). Similar legislation is being developed to support the unbundling and eventual introduction of PSP in the railways sector.

In the water sector, the recent BOT for the first-ever wastewater treatment in Zagreb is the highest profile example of PSP. It is also the first-ever BOT (in any sector) undertaken in Croatia. Currently, wastewater from Zagreb is discharged directly into the Sava River, causing serious pollution. A European Bank for Reconstruction and Development (EBRD) loan of EURO 55 million (USD 65 million) will help the city tackle this problem and comply with European Union (EU) environmental standards. The EBRD's loan is being provided to Zagrebacke Otpadne Vode (ZOV), a private company chosen through an international tender to build, operate and maintain the treatment plant. In addition to building the plant, ZOV will also construct supporting infrastructure. The city will control the private company through a long-term concession contract, which sets out the discharge standards that the wastewater must meet.

### **III. The Water Sector in Croatia**

The legal authority for the provision of water and wastewater services in Croatia has been decentralized to the municipal level. While this has resulted in more demand-responsive and locally appropriate approaches to service provision, it has hindered the development of regional solutions to such problems as wastewater treatment, water resources management, and environmental protection. In addition, many of the municipalities in Croatia lack the capacity to finance needed investments or undertake comprehensive long-range planning in the water and wastewater sector.

Although the decentralized framework transfers the responsibility for service provision to the local level, municipalities still in many respects lack the autonomy to fulfill their obligations. For example, once a municipality determines its investment requirements and develops a plan for new capital works, it must apply to the Ministry of Environmental Protection and Physical Planning (MEPPP) for a location permit before it can break ground. In order to receive a location permit, it must first carry out an environmental impact assessment that must be reviewed and approved by the Ministry. These national-level approvals and the process required to obtain them are the most time-consuming aspect of the capital planning process.

#### **III.1 Hrvatska Voda**

Hrvatska Voda (HV), or “Croatia Waters,” is the national government entity responsible for planning and policy setting in the area of water and wastewater treatment. According to its website, HV’s full range of responsibilities include:

- General water management;
- Studies, data, and project assignments and revisions;
- Investing and other financial issues;
- Coordination of plans for water use;
- Setup and maintenance of integrated data systems for water management;
- Control, survey, and information on water conditions;
- Maintenance and regulation of watercourses;
- Ice and flood control;
- Construction and maintenance works in water management;

- Designing of water control systems and other systems in water-related activities;
- Protection of water resources;
- Development and monitoring of water supply;
- Usage control and other protective measures; and
- Enforcement of legal sanctions in water conservation.

Recently, the GOC has undertaken some preliminary initiatives to rationalize the institutional structure of HV. The new role envisioned for HV is premised on the corporatization of water supply services at the municipal level, the regionalization of wastewater management, and the introduction of PSP in the financing and management of wastewater treatment facilities.

In its new role, HV effectively has regulatory authority over most water activities, including water abstraction, construction of domestic water supply and wastewater systems, pollution discharges, sand and gravel excavation, fish culture, and hydropower development.

HV also has a key role to play in assisting in the financing of new capital investment in water and wastewater infrastructure. Funding for such investment comes from:

- HV's role as on-lender of funds from HBOR (see below);
- Water abstraction fees;
- Pollution charges; and
- The central budget.

While most of the funds collected from the national government through the central budget and from municipalities (through pollution charges and abstraction fees) go towards capital investments, a portion of those funds is retained by HV to cover its administrative costs.

In principle, HV provides funding to municipalities for capital investment in the form of loans. However in practice, funding tends to take the form of a debt-equity swap with the municipal utilities. There are some legal limits on this - by law, HV may assume no more than a 49% share in the ownership of any municipal utility company. In most cases, this debt-equity arrangement has not been formalized and HV has not been legally assigned ownership. As a result, the ownership structure of many utilities in Croatia is indeterminate.

### **III.2 Hrvatska Banka za Obnovu I Razvitak**

Hrvatska Banka za Obnovu I Razvitak (HBOR) or, the “Croatian Bank for Reconstruction and Development,” is the entity responsible for providing financing for investment in Croatia’s water and wastewater sector. HBOR was established in 1992 under a Special Law in order to channel funds for emergency and other reconstruction investments needed during the war. After the war,

HBOR’s primary role shifted to providing funding for development activities of regional or national importance in Croatia. In this capacity, it provides medium- to long-term financing for projects, such as infrastructure investments, with long payback periods.

Whereas HV is the lead technical agency responsible for ensuring the feasibility of projects and undertaking detailed design work, HBOR is the sole provider of credit to Croatia’s municipalities and as such is responsible for assessing their creditworthiness and capacity for borrowing to support investments in infrastructure.

HBOR finances municipal investments in three ways:

- Through direct lending to municipalities;
- As a second tier bank through local commercial banks; and
- Through HV (this represents bar far the largest element in HBOR’s lending portfolio).

### **III.3 Regulation of the Water Sector**

#### ***III.3.1 The National Level***

Unlike the newly-formed regulatory agencies in the telecommunications and energy sectors, there is no independent regulatory agency governing the water and wastewater sector in Croatia. Rather, regulatory responsibility is split between various agencies and ministries at the national level, as well as regional and local government entities.

The Water Act of 1995 provides the legal foundation for the regulation of water resources in Croatia and gives responsibility for the country’s water management regime to the State Water Directorate. Management of water resources is administered within catchment areas through collaboration between HV and local bodies.

The Ministry of Environmental Protection and Physical Planning (MEPPP), established in 2000, is responsible for setting and enforcing regulations relating to sustainable development throughout Croatia. This includes the protection of air, water, soil, sea, flora, and fauna. Surface waters (rivers, lakes, and artificial lakes), groundwater, and the coastal zone waters are classified in one of four categories in accordance with their utilization and quality. New environmental standards detailing the maximum allowable concentrations are in preparation. Until they are adopted, however, no standards or guidelines exist at the national level.

Drinking water quality monitoring is the responsibility of Croatia's Institute for Public Health (IPH), and monitoring is undertaken on a weekly basis. Any utility that sells more than 100 l/second of water is required by Croatian law to maintain its own, in-house laboratory for water quality monitoring and testing, and must report the results of these tests to IPH. Utilities whose water sales are below this threshold may either send their samples to a commercial laboratory to be tested for a fee or send them to a regional bureau of IPH for testing at no cost. In addition to the regular, weekly samples, provided by utilities, IPH also conducts random sampling of each water system. Although there are wastewater quality standards in existence in Croatia, these are not currently being enforced.

As the GOC takes steps to strengthen the legal and regulatory framework for the water sector within Croatia, it is also looking outwards at transboundary water issues. To this end, the Government has ratified:

- The Convention on the Protection of Transboundary Waters and International Lakes (Helsinki, 1992)
- The Convention on Water Management Cooperation for the Protection of the River Danube (Sofia, 1994)
- The Convention for the Prevention of the Mediterranean Sea Against Pollution
- The Protocol for the Prevention of the Mediterranean Sea Against Pollution from Land-Based Sources (with Annexes I, II, and III)

In addition, the Government has entered into cooperation vis-à-vis water management issues with the Governments of Hungary, Bosnia and Herzegovina, and Slovenia.

### *III.3.2 The Local Level*

According to the Municipal Services Act (NN 36/95), which defines municipal services (including water supply and wastewater treatment and disposal), municipal services may be performed by:

1. A company founded by one or more local government units;
2. A public institution founded by a local government unit;
3. A service plant, established by one or several local government units; and,
4. A legal entity or person, subject to concession agreement.<sup>6</sup>

At present, 130 Croatian service providers (mainly located in larger urban areas) provide water supply and limited wastewater treatment services. Local government units founded many of these companies, with more than 99 percent of these limited liability companies majority owned by local municipal governments.

Funding for the activities of municipal service companies is provided from various sources. However, in the case of water supply and wastewater disposal and treatment, the funds are generally provided from fees charged for the service. The service provider determines the price and the method of payment for the provision of the service. In general, there are no administrative or legal limitations on the tariff. The tariff is for all practical purposes controlled by the company's founder (i.e.; the local government).

The basic economic regulations influencing the local price of water (and, the corresponding legislation) is presented in Table 1 on the following page.

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<sup>6</sup> See "Water Pricing in Croatia, Current Policies and Trends," *The Regional Center for Central and Eastern Europe: Croatia-Country Description*. Edited by Marina Markovic. Page 12.



**Table 1: Tariff Category and Corresponding Legislation**

<b>Tariff Category</b>	<b>Paid By</b>	<b>Legislation</b>
Price of Municipal Service	Paid by end users	The source of revenue for municipal services is defined by the Municipal Services Act (includes the service, repayment of loans for construction of facilities and municipal infrastructure). The price is determined by the provider of the municipal service with the consent of the owners of the company.
Water User Fee	Paid by legal entities and persons that abstract or pump water from water courses, lakes, storage reservoirs, ground aquifers, and other natural resources.	The source of revenue for financing water management is defined by the Water Management Financing Act (NN 107/95). The fee is determined by the GOC.
Water Protection Fee	Paid by legal entities and persons that discharge wastewater or other substances that pollute water.	The source of the revenue for financing of water management is defined by the Water Management Financing Act (NN 107/95). The fee charged is determined by the GOC.
Concessions on Water and Water Estate	Paid by concession holder for: Water abstraction for public water supply; use of water power for electricity generation; water abstraction for technological purposes in industrial and similar activities; pumping of mineral and thermal waters – water abstraction for irrigation; and, fish farming in enclosed bodies of water.	Concession provides the right of use of water and water-related estate (i.e.; the right to perform economic and other activities on water and water related estate).

Source: "Water Pricing in Croatia, Current Policies and Trends," The Regional Center for Central and Eastern Europe: Croatia-Country Description. Edited by Marina Markovic. Page 14.  
Booz Allen Hamilton, 2003

## **IV. Water Services in Kostajnica**

Hrvatska Kostajnica (referred to herein as “Kostajnica”) is located on the banks of the river Una in eastern Croatia. During the Yugoslav war, the city was occupied by Serb forces and much of the town and its basic infrastructure destroyed. Following the war, the river Una, which previously ran through the middle of the city of Kostajnica, became the national border between Croatia and Bosnia-Herzegovina, thereby separating “Hrvatska Kostajnica” (or, “Croatian Kostajnica”) from Bosinska Kostajnika (or “Bosnian Kostajnica”).

Prior to the war and the division of the city, Kostajnica had a population of 16,800. According to the 2001 census, Hrvatska Kostajnica has a population of 2,500. There is some disagreement over the total population, however, with the municipality claiming that there are 3,800 residents, and the local police claiming that there are 6,200. For the purposes of this Report, we have used the city’s estimate of 3,800 people (this is also the number that the utility uses in its planning).

### **IV.1 Institutional Review**

Komunalac was established in 1995 as a corporatized utility that provides water, sewerage, solid waste, and parks, market and cemetery management in the town of Kostajnica. Komunalac served only Hrvatska Kostajnica until 1997, when local borders were reorganized and it assumed responsibility for service provision in the nearby municipalities of Majur and Donji Kukuruzari (Majur’s population is estimated at 2,400 and Donji Kukuruzari’s at 2,600). Komunalac is wholly owned by the city of Hrvatska Kostajnica<sup>7</sup>, and the City Council serves as the company’s governing board.

Komunalac is a small operation serving a population of approximately 9,000 persons (or, about 1,780 total connections with 1,056 household metered connections and 24 metered business connections). Local consumption of water has increased by less than 1% per annum on average since the end of the war in 1995. According to the E.A. Inspekt engineering study (December, 2002) the

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<sup>7</sup> When Hrvatska Kostajnica was divided in 1997 into Kostajnica, Majur, and Donji Kukuruzari, ownership in Komunalac should have been split proportionately between the three towns. However, because the utility was operating at a loss, Majur and Donji Kukuruzari declined to assume their share of ownership, thereby leaving the company entirely in the hands of the city of Hrvatska Kostajnica.

existing water supply system is more than sufficient to satisfy current and future demand<sup>8</sup>.

The primary obstacle confronting the utility is that the size of one of its reservoirs is too small. The small size of the reservoir relative to the needs of the community creates an operating environment where the utility is forced to continuously pump water into the pipeline network system. The continuous pumping of water into the network results in substantially elevated pressure levels in some parts of the system (and, pipes frequently burst). Following construction of the new reservoir at Panjic, the utility expects water pressure levels to drop to more normal levels and that technical water losses will be reduced from their current 70% to 80% level(s), to around 40%.

This reduction in technical water losses is expected to significantly reduce the cost of the service provider's electricity usage. The primary objective of this report is therefore to review the current financial status of Komunalac, and to determine the factors that will enable it to finance the capital investment projects necessary to reduce current water loss levels.

#### *IV.1.1 Komunalac Corporate Charter*

A review of the Komunalac articles of incorporation provide the following main activities for the utility:

- To supply the general population, enterprises, and other organizations of Kostajnica and the local community with drinking water; and,
- To maintain and repair the municipal property used by the utility in its water and wastewater activities.

The corporate charter requires the utility to be financially self-sufficient and operate through revenue collected from its user charges. To achieve these goals, the utility is allowed to:

- Purchase property and non-property rights and alienate (sell or lease) property with the approval of its Directors (Founders)<sup>9</sup>;
- The right to receive credits;

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<sup>8</sup> A small part of the population in Komunalac's service area receives water from unlicensed private wells. According to the Director of the service provider in addition to the Komunalac water network, there are two unlicensed community constructed water networks.

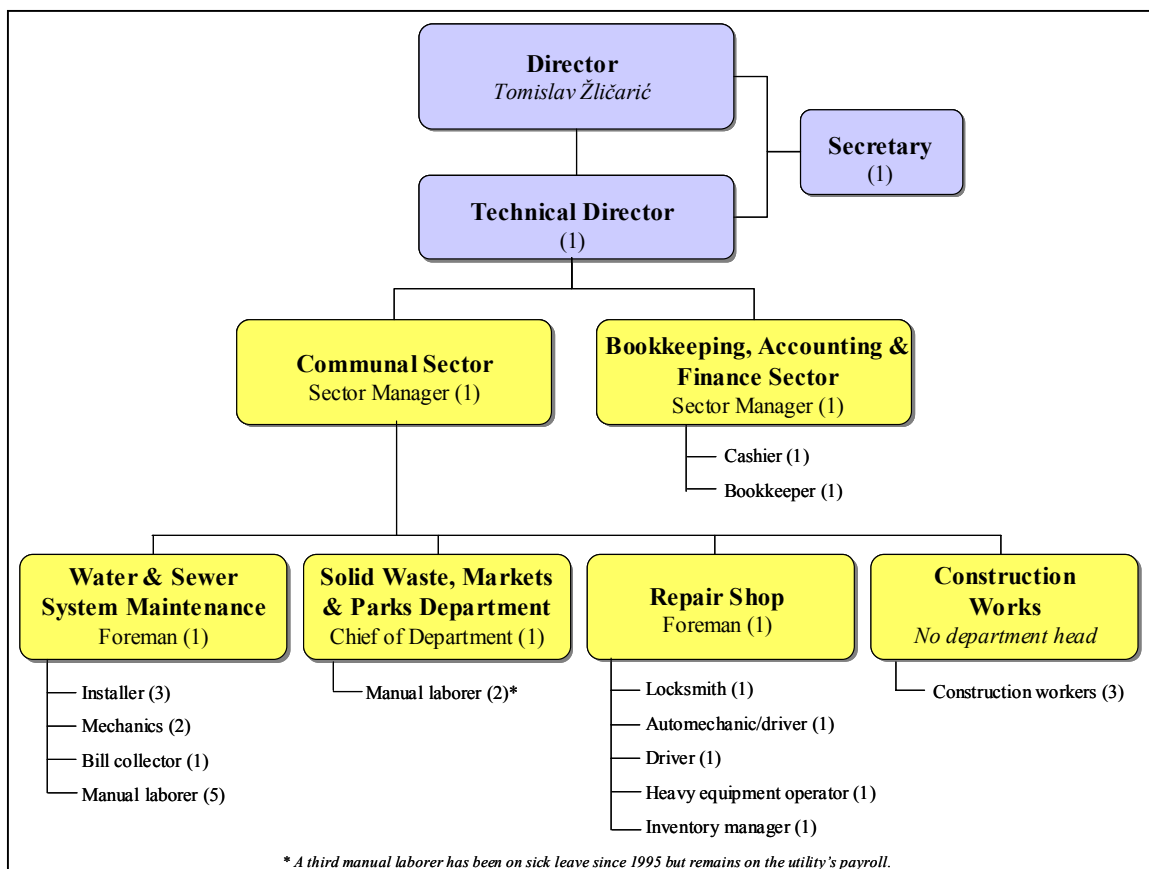
<sup>9</sup> Local government officials (Mayor, Deputy Mayor) serve on the Komunalac's Board of Directors.

- The right to independently approve staff, and establish the form and size of employee wages as well as other income; and,
- The right to independently determine the allocation of its net profit.

#### IV.1.2 Organizational Structure and Management

Komunalac has a total of 31 full-time employees<sup>10</sup> (see Figure 1 below) and 2 part time employees.<sup>11</sup>

**Figure 1: JP “Komunalac” d.o.o. Organization Chart**



Booz Allen Hamilton, 2003

<sup>10</sup> There is a 32<sup>nd</sup> employee on the payroll, but this person has been on sick leave since 1995 (due to post-traumatic stress syndrome resulting from the war) and is not expected to return to work any time soon.

<sup>11</sup> The part-time employees include a janitor and a warehouse worker.

The Director of Komunalac is the utility's chief executive, and is appointed by the City Council of Kostajnica. The Director must provide the following reports to the City Council:

- Annual financial plan;
- Annual business (maintenance and investment) plan; and
- Twice-yearly status reports.

The Director is responsible for determining the structure, selecting, hiring and firing of personnel, and concluding employment contracts. Approximately 17 employees (including bookkeeping, accounting, and sector manager) are directly involved in the water and sewer system operations.

Table 2, below, is an indicator of water utility operational efficiency. In brief, operational efficiency refers to the lowest cost use of labor, energy, water and materials in the day-to-day operation of a utility. Ratios between inputs and outputs provide an indication of operational efficiency. Two such ratios are staff per '000 connections, and staff per '000 persons served. A high number for either measure may indicate inefficient use of staff.

Table 2 shows that the water/sewerage business unit of Komunalac currently serves about 530 general population customers per employee.<sup>12</sup> Komunalac has a higher work force to customer ratio compared to the average European, Latin American, Russian or American water utility. This ratio indicates that Komunalac may be overstaffed relative to the general size of its operational base.

**Table 2. Total Number of Employees Per Persons Served**

Entity	Number of Employees per Person Served
Komunalac Kostajnica	1 per 530 persons
Average Russian Water Utility	1 per 380 persons
Average European Water Utility <sup>13</sup>	1 per 2,000 persons
Average Latin American Water Utility	1 per 1,500 persons

Source: World Bank, 2000

Booz Allen Hamilton 2003

<sup>12</sup> According to a recent engineering study, and local service provider officials, Komunalac serves a population of about 9,000 inhabitants. Total water and sewer system employment is estimated at around 17 persons.

<sup>13</sup> The average European and Latin American water utility numbers includes medium and large water utilities such as Sao Paulo, Brazil and Frankfurt, German.

### *IV.1.3 Administration*

Komunalac's accounting department follows the Croatian Federal Government regulations on accounting and guidelines issued by the Ministry of Finance. In accordance with current Croatia legislation, the accounting department produces collected revenue adjusted quarterly and annual balance statements (i.e., the expenses which they report for tax purposes are adjusted to reflect income received). Komunalac files tax returns for small business enterprises. The utility has not been audited for a number of years. Komunalac has a comprehensive financial accounting software system and undertakes some cost accounting analysis and broad work allocation (i.e., attributing to the appropriate cost centers their respective expenses).

### *IV.1.4 Urban Planning*

Komunalac maintains an up-to-date asset register, which includes depreciation schedules for all assets. The utility estimates that 50% of the network requires rehabilitation, and there are some significant renewals required (including the main pipeline running through the city, built in 1972 of asbestos concrete). There is no map of the system.

The utility maintains an annual financial plan, but not an annual budget. The financial plan is approved annually by the City Council. The project team was unable to coordinate schedules with local municipal authorities (the owners of the water utility). However, discussions with Komunalac indicate that the local municipal government of Kostajnica only undertakes minor capital investments.<sup>14</sup> The City Council has its own investment plan, as well as a ten-year development strategy. Some of the items listed in the investment plan and the ten-year strategy are included in the town budget, but most items are intended for grant funding.

Discussions with representatives of the Urban Institute (Croatia) indicate that substantial work with small local municipal governments must be undertaken to strengthen their capacity to undertake necessary investment requirements. Under the current law, municipalities derive a substantial portion of their revenues from taxes shared with the central government (i.e.; 45% of

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<sup>14</sup> The Municipality of Kostajnica apparently has a municipal development department that engages in the municipality's capital investment planning, funding and implementation plan. Kostajnica apparently has a ten-year municipal development and investment strategy. The IP3 and BAH consultant were, however, unable to obtain a copy of the Kostajnica's ten-year municipal development strategy. According to the Director of the local service provider, most of the item's listed in the municipality's capital investment plan are expected to be financed by Government of Croatia (GOC) grants.

income taxes, 10 % of corporate taxes, and 60% of property taxes) and from local taxes (i.e.; parking fees, income tax surcharges etc.). The central government provides transfers for certain purposes.

As a result, the borrowing capacity of most small local municipalities like Kostajnica is limited. Annual municipal debt service, according to Croatian Law, cannot exceed 20% of budget revenues. However, very few Croatian municipalities have been in a position to borrow for long-term infrastructure investments. According to EBRD estimates, there was a significant discrepancy in the level of capital/investment spending undertaken by the 20 Croatian counties in 1999.<sup>15</sup>

War affected counties (and, local municipalities) such as Vukovar-Sirmium and Sibenik-Knin spent less than one (1) HRK per capita on environmental infrastructure compared with 37 HRK per capita for the entire country. The increase in the number of small municipalities is posing a key challenge with respect to the abilities of the fragmented municipalities to undertake necessary investments in water and wastewater treatment, solid waste, and urban transport.

## **IV.2 Technical Review**

### ***IV.2.1 Water Services***

To meet its raw water needs, Komunalac relies upon groundwater from three wells located approximately 11 kilometers from the center of Kostajnica. The quality of groundwater is very high, requiring only chlorination<sup>16</sup> (not filtration), and water is pumped from the wells at a constant temperature of 11° C. Current water production capacity is 36 l/s/day. The limiting factor is pump capacity, with one pump capable of handling 20 l/s/day, and two capable of 8 l/s/day each. The utility estimates that the quantity of water available from the aquifer<sup>17</sup> - estimated at 130 l/s/day - is more than enough to meet the company's long-term needs. In an average day, Komunalac pumps 16 l/s/day through the two 8 l/s/day pumps. At night, only one pump is needed to maintain system pressure.

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<sup>15</sup> See EBRD's "Strategy for Croatia", November 19, 2002 for more detailed discussion of the macroeconomic and current Croatian investment environment. Page 21.

<sup>16</sup> Chlorine dosage is 0.25%.

<sup>17</sup> All three wells source water from the same aquifer.

Komunalac's piped water distribution system totals 76 km and serves 1,756 residential customers and 24 commercial customers<sup>18</sup>. Some of the population living within Komunalac's service area receive water from unlicensed private wells, and there are two private, unlicensed, community-constructed local water networks. Because the utility does not monitor these or maintain any data on the number of households receiving water through the wells or the private networks, we were unable to determine the utility's coverage ratio. Although in theory the wells and private networks are illegal (because they are unlicensed), no attempt has been made to either legalize them or bring them in to the utility's network.

Sixty percent of customers are metered, and meters are checked by the utility for accuracy on a monthly basis. Non-metered customers pay a lump sum for water, set at 10 m<sup>3</sup> per month. Bills are issued monthly in accordance with the Consumer Protection Act.

Estimates of Komunalac's UFW vary between 40% and 80%, with the utility estimating that 60% of UFW is technical losses<sup>19</sup>. Because of the small size of the three existing reservoirs, the utility is forced to continuously pump water into the system. The result is that pressure in some parts of the system – most notably in downtown Kostajnica – is too high and pipes frequently burst. Following construction of the new reservoir at Panjic (see the section on "Investment Priorities" below), the utility expects that pressure will be normalized and technical losses will be reduced by 30%. At the same time, the reduction in pumping will bring the cost of electricity down by an estimated 60%.<sup>20</sup>

According to Komunalac's management, the utility is currently undertaking preventive and regular maintenance where possible and financially feasible. There has been limited additional capital investment due to insufficiency of funds provided by the current tariff structure. Most current

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<sup>18</sup> The utility does not differentiate between commercial and industrial users. Before the war, there were several large industrial facilities in Kostajnica and at that time, the utility had separate customer classes for them. Today, these industries are not operational. The number of current business customers is artificially low, as many small entrepreneurs declare themselves to be residential customers in order to take advantage of lower tariffs.

<sup>19</sup> The UFW estimate of 40% is based on total average monthly production of 260,000 m<sup>3</sup> and total average monthly billings of 117,000 m<sup>3</sup> per month, with UFW defined as the volume of water billed divided by the total volume of water produced. The 80% estimate is the utility's best estimate as to actual UFW in the absence of a fully metered system. Accurate measurements will only be possible once flow meters are installed at key network locations and all customer meters are in place and properly functioning.

<sup>20</sup> There is additional possibility to reduce electricity costs even more through optimization of the pumps. Currently, the utility does not know actual pump capacity or Q curves, and therefore they are unable to optimize pump usage.



maintenance and repair efforts are geared towards reducing water loss when lines break (or pollution when a sewerage line breaks).

Local service provider officials (see Table 3, below) indicated that, in 2001, Komunalac produced about 570,000 m<sup>3</sup> of water. The level of water production increased to about 760,000 in 2002. Households used about 128,000 m<sup>3</sup> of water while businesses used (on average) 29,000 m<sup>3</sup> of water.

Komunalac has several flow meters but they are not sufficient to provide a system-wide evaluation. The Managing Director of the service provider presented the water production and loss figures in Table 3 below. However, in various conversations, utility officials indicated that the water loss rates may be significantly lower. In the absence of effective metering, the utility has provided estimated water production, billed and loss levels. The level of water losses should be analyzed (and, reviewed) with a degree of caution.

**Table 3: Komunalac Production, Delivery, and Estimated Water Losses<sup>21</sup>**

	2000 Cubic meters (m <sup>3</sup> )	2001 Cubic meters (m <sup>3</sup> )	2002 Cubic meters (m <sup>3</sup> )
Komunalac Water Production (m <sup>3</sup> )	567,648	567,648	756,864
Water Delivery Households (m <sup>3</sup> )	127,222	127,429	127,271
Water Delivery Businesses (m <sup>3</sup> )	34,473	29,919	20,670
Subtotal Water Delivered	161,695	157,348	147,941
Water Loss (m <sup>3</sup> )	405,953	410,300	608,923
% Water Loss	71.2%	72.2%	80.4%

Source: Komunalac d.o.o. April 2003, BAH' estimates  
Booz Allen Hamilton, 2003

#### ***IV.2.2 Wastewater Services***

Thirty percent of the customers in Komunalac's service area are connected to the utility's piped sewage collection system. This system is comprised of one primary main ("Collector 1"). A second main ("Collector 2") is currently being built with funding from HV and the Ministry of Public Works. When construction on Collector 2 is completed, all of the customers in downtown Kostajnica will be connected to the system. This will bring the total percentage of customers served by the piped system to 60%.

<sup>21</sup> The service provider has some flow meters in place, but this 70-80% water loss number is an estimated figure. Real water loss levels (in all likelihood) are substantially lower than this 70-80% range.

Sewage collected by Komunalac through Collector 1 is dumped untreated into the river Una, which flows through Kostajnica and represents the border between Croatia and Bosnia-Herzegovina<sup>22</sup>. When Collector 2 comes online, that sewage will also be disposed of without treatment into the Una. The municipality of Hrvatska Dubica is the only community that lies downstream of Kostajnica on the river Una, however after Dubica, the Una flows into the river Sava, a major waterway in Croatia. As a result, downstream contamination is an issue of concern.

Customers not connected to the piped sewage collection system dispose of their sewage in septic tanks. Many septic tanks are poorly constructed and are leaking into the groundwater table. However, because customers with septic tanks are located far from the aquifer where Komunalac sources its water, the utility is not concerned about groundwater contamination in those areas. Septic tanks are emptied by their owners and the sewage is typically re-used as fertilizer for crop growth.

Prior to the war, in the late 1980s, the city commissioned a sewage treatment study that recommended the construction of a facility for the mechanical, chemical, and biological treatment of sewage. At that time, there were several highly polluting industries in the city – including a textile dying facility and a shoe factory (which used a toxic glue in its manufacturing process) – that made chemical treatment a necessity. No major study has been completed since that time, but the utility estimates that due to the closing of the textile and shoe factories, only mechanical and biological treatment will be needed<sup>23</sup>.

#### ***IV.2.3 Capital Investment***

In Kostajnica, Komunalac itself is responsible for developing its capital investment strategy and for doing the detailed design work to support the strategy. Komunalac's capital investment program is embodied in an annual maintenance and investment plan that it presents annually to the City Council. As a matter of practice, the utility only includes items that it can self-finance in this plan. It is not uncommon for the City Council, for political reasons, to add its own projects to Komunalac's plan.

At this time, the following are Komunalac's top investment priorities:

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<sup>22</sup> In actuality, Kostajnica shares the border with the Republika Srpska.

<sup>23</sup> There is a possibility that the shoe factory will soon resume operations. If this is the case, or if other polluting industries locate in Komunalac's service area, further analysis will be required to determine whether a future municipal facility will need to provide chemical treatment, or whether industries should be required to pre-treat their effluent.

- **New Reservoir:** The utility is in the process of constructing a new 1000 m<sup>3</sup> reservoir at Panjani with funding from USAID. USAID will also provide the funds to connect this reservoir to the telemetry system being funded by HV (see below).
- **Telemetry System:** HV has provided funding for the installation of a telemetry system.
- **System Expansion:** The nearby municipalities of Hrvatska Dubica, Sunja, and Dvor currently abstract raw water from their own wells. In the case of Hrvatska Dubica and Sunja, the quality of water from the wells is poor, with pollution from nitrates and high iron content. Komunalac would like to build mains from Kostajnica to Hrvatska Dubica and to Sunja in order to sell bulk water to the utilities in these towns<sup>24</sup>. Bulk sales to Dvor are a lower priority, as the quality of water there is better than in the other two towns.
- **Wastewater Treatment:** Komunalac has applied for EBRD funding to support the development of a wastewater treatment facility that would serve not only the Komunalac service area, but Bosinska Kostajnica as well. The application for EBRD funding was submitted through the Ministry of European Integration in connection with Croatia's application for membership in the EU.

Once the City Council approves Komunalac's investment plans, the utility can apply for funding from HV for a feasibility study. Following completion of the feasibility study, Komunalac must apply for a building permit from the MEPP. This is one of the most time-consuming stages in the capital investment process, requiring national-level authorization for local works.

Once the building permit is received, Komunalac must then identify an appropriate source of funds. There are three primary sources of funding for capital works in Kostajnica:

- **Hrvatska Voda** provides funding upon request for the construction of capital assets;
- The utility may **self-fund** projects through its budget, once approved by the City Council; and
- The utility may apply for funding from a variety of **bi- and multi-lateral donors**.

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<sup>24</sup> Komunalac estimates that bulk sales to Sunja and Dvor would serve 5,000 additional customers.

All loans for capital works come from HBOR, and loan guarantees are provided by HV.

#### IV.2.4 Water Demand Trends

Table 4, below, provides an estimate of potential future water delivery for Komunlac over the medium term. The forecast is derived from discussions with water utility management, a consulting report produced in 2003<sup>25</sup> and our best estimates. In brief, water delivered to households is not expected to increase significantly over the medium term.

Based on the current level of repairs and rehabilitations, the water loss level (percentage) is expected to modestly decline. Nevertheless, Komunlac intends to invest in expanding its water reservoir to reduce water pressure in the network, purchasing additional flow meters and water loss equipment and in repairing pipes and fixtures to reduce system-wide water losses.

**Table 4: Komunlac - Estimate of Water Production, Delivery and Losses<sup>25</sup>**

	2001	2002e	2003 <sup>26f</sup>	2004f	2005f
WATER PRODUCTION (m <sup>3</sup> )	<b>567,648</b>	<b>756,864</b>	<b>667,500</b>	<b>350,000</b>	<b>350,000</b>
WATER DELIVERY (m <sup>3</sup> )					
Households	127,249	127,271	130,000	130,000	130,000
Industry/Businesses	29,919	20,670	28,000	28,000	28,000
<b>Subtotal</b>	<b>157,348</b>	<b>147,941</b>	<b>158,000</b>	<b>158,000</b>	<b>158,000</b>
<b>Estimated Losses</b>	<b>410,300</b>	<b>608,923</b>	<b>509,500</b>	<b>192,000</b>	<b>192,000</b>
Est. (%) Losses	72.2%	80.4%	76%	54.8%	54.8%

Note: F=forecast; Est=Estimate  
Booz Allen Hamilton, 2003

<sup>25</sup> The water production and loss levels are estimated figures that the service provider presented to the BAH/IP3 consultants. The utility has a few flow meters but these are insufficient in providing accurate system wide loss figures. The estimated water production and loss figures should be analyzed (and, used) with caution. The BAH consultants have limited confidence in their accuracy.

<sup>26</sup> The Komunlac Managing Director stated that he hoped to have additional investment funds from USAID to start and complete the water reservoir expansion by late 2003 or early 2004. This extremely cursory forecast takes into consideration that an expanded reservoir is built, that water pipeline pressure (and, leakages) are significantly reduced, and the household (and, business) water demand remain relatively unchanged.

### IV.3 Financial Review

#### IV.3.1 Customer Billing and Collections

Komunalac's Director indicated that 60% of all households and businesses were metered for their water usage. In actuality, approximately 1,056 households and 24 businesses are metered. Most customers (households and businesses) are billed based on their metered consumption. However, approximately 40% of Komunalac's customers are not metered and are billed on a flat monthly rate basis.

The utility bills and collects directly from their customers. One (1) utility staff member is assigned the task of billing and collections. The head of the accounting and finance department stated that the utility water collection rates average between 20 and 30%.<sup>27</sup> Komunalac collects wastewater fees from about 30% of local households and businesses through its piped sewerage network.

#### IV.3.2 Tariff Description and Level of Cost Recovery

This section describes the basic tariff structure put in place by Komunalac. The Municipality of Kostajnica in consultation with the municipalities of Majur and Donji Kukurusari sets water and sewerage tariffs in the Komunalac service area. The tariff is structured in five layers and is described in Table 5, below.

**Table 5: Komunalac d.o.o. Tariff Structure**

Variable:		
(1)	Water consumption	Volumetric (m3)
Fixed:		
(2)	Meter maintenance fee	n.a.
(3)	VAT (Ministry of Finance) <sup>28</sup>	22%
(4)	Environmental tax (HV)	Volumetric (m3)
(5)	Extraction fee (HV)	Volumetric (m3)

Source: The Institute for Public-Private Partnerships (IP3), Inc., April 2003  
Booz Allen Hamilton, 2003

<sup>27</sup> The BAH team asked for more detail regarding the utility's collection rates. However, there was limited time available for collecting and analyzing the data. Komunalac utility does not age its receivables. Komunalac simply records payments when received (regardless of the period for which payment was made). In the future, it would be advisable for the utility to age any outstanding receivables.

<sup>28</sup> In the case of RAD's water utility bill, the VAT component would be applied to only the water consumption fee. If RAD had a municipal service fee for sewerage, the VAT would be applied to that component of the tariff schedule only.

There are two customer categories: domestic, and commercial/industrial. Each customer category is charged a flat volumetric rate for water consumption. If there is a shortfall in collection of tariffs, that shortfall is allocated proportionately across all six parts of the tariff.

Table 6, below, illustrates the tariff schedule by layered component. A cursory review indicates that local domestic water tariffs have generally not increased since FY 1995. Discussions with Komunalac officials indicate that they have attempted to increase tariffs numerous times over the past eight years but have been met with substantial local community opposition.

**Table 6: Water Tariff Structure (in HRK/m<sup>3</sup>)**

Household Tariffs	2000	2001	2002
(1) Water Consumption (Komunalac)	3.15	3.15	3.15
(2) Meter Maintenance fee (Komunalac) <sup>29</sup>	n.a.	n.a.	n.a.
(3) VAT (MOF)	0.69	0.69	0.69
(4) Environmental Tax (Croatia Water)	0.90	0.90	0.90
(5) Abstraction Fee (Croatia Water)	0.80	0.80	0.80
Total	5.54	5.54	5.54
Business			
(1) Water Consumption (RAD)	4.30	4.30	4.30
(2) Meter Maintenance fee (RAD)	n.a.	n.a.	n.a.
(3) VAT (MOF)	0.22	0.22	0.22
(4) Environmental Tax (Croatia Water)	0.90	0.90	0.90
(5) Extraction Fee (Croatia Water)	0.80	0.80	0.80
Total	6.95	6.95	6.95

Booz Allen Hamilton, 2003

The structure of Komunalac's water tariff currently does not have automatic inflation adjustment mechanisms (escalators) to accommodate increases in the cost of production inputs due to inflation. One of the near-term improvements that the municipality and Komunalac should undertake is to allow the tariff structure to increase in line with a basket of the service provider's operating expenses (i.e., electricity and fuel).

In addition to the tariff schedule outlined above, there are about 750 consumers in the Komunalac water service area that pay a lump sum to the utility for their water use<sup>30</sup>. Total water consumption revenues from these non-metered users are estimated at HRK 7,500. The lump-sum tariff for these non-metered water users is HRK 10 m3. Komunalac officials believe that non-metered water users are using substantially more water than they are billed.

Komunalac (according to its Director) currently collects between 20% and 30% of what it bills. According to Croatia Law, the utility has the legal authority to shut-off service to non-paying customers. However, the utility's manager is reluctant to shut-off service to customers. At present, Komunalac has shut-off service to (only) 72 of its customers due to payment arrears.

<sup>29</sup> Komunalac apparently does not include a meter maintenance charge in the tariff calculation. It is apparently a separate (distinct) flat (or additional) charge.

<sup>30</sup> About 750 consumers are not metered and have historically paid a lump sum to the utility. The service provider is trying to hook these water users to meters.

According to a Hrvatske Vode Report, the average household price of water in Croatia was HRK 4.88 /m<sup>3</sup> in 2001 (or, Euro 0.63/ m<sup>3</sup>). In general, Croatia household water consumption tariffs varied from HRK 2.44 / m<sup>3</sup> to HRK 6.94 /m<sup>3</sup>. In comparison to the Croatia average for fiscal year 2001/2002, Komunalac's locally determined household water tariff is in the lowest range of Croatian service providers.

Revenues collected from household water fees do not cover full economic costs of water supply (and, waste water treatment). As a result, Komunalac's water supply network is in relatively poor condition. The relatively high percentage of leakages in public water supply best illustrates the shortage of funds (necessary for proper maintenance and development of the network). Komunalac's tariff is currently (only) sufficient for financing essential maintenance and the most urgent of (repair) investments.

#### *IV.3.3 Cost and Value of Water*

Potable water is an economic good and delivery of water to consumers has legitimate costs that have to be recovered from those consumers. Management of water resources has to be economically efficient and environmentally sustainable. Cost recovery is essential to ensure efficient and sustainable operation of the system. The latter includes the need to ensure that maintenance costs, debt service and depreciation are covered. The price of water, or tariff charged to consumers needs to reflect these costs for sustainability to be ensured. Unfortunately, it appears that Komunalac's tariff structure does not cover depreciation (amortization) and does not recover full costs.

Circumstances in Kostajnica, Croatia are not dissimilar to many Eastern European (Balkan) countries and could be described as a "low-level equilibrium trap", in which the quantity and quality of services provided are poor in large part because revenues do not match expenditures. The result is that maintenance is sub-optimal and services deteriorate. Operation and maintenance (O&M) costs tend to escalate (as do the subsidies needed to cover them).

Many water sector parameters indicate that Komunalac is in a similar position to many water utilities in developing countries. Comparisons are provided in Table 7 that indicates that in terms of operational efficiency measures, Komunalac has significant scope for operational efficiency improvement.



**Table 7: Comparison of Komunalac Kostajnica Operational Indicators  
With Those of Other Utilities**

Parameter	Unit	Komunalac Water Distribution Network	Other Developing Countries	Developed Countries
Unaccounted for Water	Percent (%) annual Production	80%	40 – 50 %	8 – 17 %
Rate of bill collection	Percent (%)	20-30% <sup>31</sup>	40 – 70 %	98 %
Organization efficiency	Employees per 1000 Connections	38 (estimated)	10 – 25	2 – 4

Source: World Bank OED Technical Paper No 5, Laktasi Water Utility Co. BAH 2003  
Booz Allen Hamilton, 2003

#### ***IV.3.4 Average Price of Water in Relation to Net Salary***

Precise data on the relationship between the average cost (expenses) paid by Croatian household water consumers and their income apparently does not exist. Nevertheless, some comparison of water prices and household income can be undertaken. The average annual consumption of water by Croatians is estimated at 60 m<sup>3</sup> per user per year<sup>32</sup>. Multiplying the average water use by the average 2001 Croatian tariff of 4.88 implies that Croatians paid on average HRK 2.93 for water in 2001. According to the Croatian National Statistics Institute, the average 2001 net monthly salary was HRK 3,055. The 2001 average annual net salary is estimated at HRK 36,660. By dividing total average water payment by total annual net salary the total cost of water consumption by an average Croatian household water user is less than 1% of net annual salary<sup>33</sup>. Therefore, the economic capacity of Croatian water users to pay higher tariffs should not be a constraint to future tariff adjustments.

<sup>31</sup> The thirty- (30%) percent bill collection rate was provided to BAH/IP3 Consultants. With the time available, the consulting team was unable to substantiate this modest level of collection.

<sup>32</sup> Hrvatske Vode, 2001. Statistical Table.

<sup>33</sup> A more informative method of analysis would be to compare average Croatian water prices to that of household income (rather than net salary). Household income figures were not available to the consultants at the time of this analysis. Nevertheless, a general conclusion from this type of comparison is that the average cost of water in Croatia for the average Croatian water user is not significant. However, in former war torn areas where employment and income levels may be lower than in Zagreb (for example) the cost of water may represent a significantly greater share of net salary or household income.

## **V. Financial Performance**

Our analysis of Komunalac's financial results over the past few years is based on a rapid review of the firm's 'unaudited' financial accounts as well as meetings with Komunalac's officials. Although the project team had only limited time with Komunalac and their financial officers, a cursory review of the utility's unaudited financial accounts indicate that they do not fully adhere to international audit standards in a number of areas (e.g. treatment of receivables, and computation of cash flow) and failed to provide a sufficient level of financial information regarding the cost and revenues associated with the firm's other small businesses (i.e., solid waste management, cemetery clean-up). That being said, Komunalac and their financial officers were able to provide a substantial amount of financial information to the project team in this rapid assessment.

### **V.1 Profitability Analysis**

Our analysis of Komunalac's water related business activity is based on a review of the firm's last three-years un-audited accounts as well as meetings with Komunalac's officials. Komunalac apparently has a comprehensive financial (cost) accounting software program. However, we had difficulties verifying whether costs were appropriately allocated to individual cost centers. Consequently, the financial figures supplied in Table 8 lack the necessary accuracy to allow for a differentiation of the firm's primary business (water) and other businesses.

Komunalac's financial statements indicate that the company has suffered substantial losses over the past few years. In 2002, the utility's total delivered water sales amounted to an estimated HRK 524,023 (USD 75,860)<sup>34</sup>, a 4% decline from fiscal year 2000. Meter maintenance and connection fee revenues managed to increase by more than 100% from fiscal year 2000, reaching HRK 69,280 (USD \$9,897) in 2002. Nevertheless, Komunalac posted substantial losses over the past three years with a 2002 operating profit margin of -23% despite the positive contribution of grants and other subsidies (revenues) from the GOC, or Croatia Water, which amounted for that year to more than 47% percent of its total revenues.

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<sup>34</sup> An exchange rate of USD 1 to HRK 7 is used throughout this document.

**Table 8: Komunalac d.o.o. Annual Cash Financial Statement<sup>35</sup>**

		2000	2001	2002
Revenues	Total Delivered Water Revenues	545,383	541,425	524,023
	Solid Waste	371,924	546,301	783,424
	Connections Fees	33,858	66,381	69,290
	Sewerage	0	165,182	0
	Grants	351,184	842,016	153,353
	All Other Revenues	1,418,071	911,089	1,047,975
	Total	2,729,420	3,072,394	2,578,055
Costs	Electric Energy (Water and Sewerage)	105,408	90,305	103,166
	Electric Energy (Other)	20,179	23,109	22,935
	Fuel (Water and Sewerage)	49,272	51,508	86,473
	Fuel (Other)	28,219	26,208	28,709
	Salaries (Water and Sewerage)	610,136	638,999	603,416
	Salaries (Other)	932,194	1,088,486	1,037,039
	All Other Expenditures	1,377,466	1,652,127	1,298,191
	Total	3,122,466	3,621,127	3,179,929
	Net Operating Income	(393,046)	(549,451)	(601,874)

Source: Komunalac d.o.o. Financial Statements  
Booz Allen Hamilton, 2003

Among the factors contributing the most to Komunalac financial losses over the last three years are:

- Overall water delivery (sales) remained relatively stable at around 150,000 to 158,000 cubic meters sold. There is little future potential for growth in terms of volume;
- Revenue from delivered water sales declined by about four (4%) percent under the combined effect of the lack of tariff re-adjustment, the non-growth in total water sales, and the relatively modest levels of water sales to industrial customers; and,
- Insufficient improvements were achieved in the level of both technical and commercial losses. Total technical water losses are estimated at 70-80%. Water

<sup>35</sup> Komunalac's Chief Financial Officer calculated the figures provided in Table 8 to come up with a "water only income state". As a result, some figures with respect to electric energy, gross salaries (etc.) may overstate water only expenses (i.e.; part of these costs should be allocated to different cost centers). For example, the solid waste expense may include some sewerage type functions undertaken by the utility but may also include some street cleaning figures etc.. RAD does not have audited financial statements making the task of financial data verification difficult. The figures supplied for the income statement in Table 8 represent the best "approximate" estimate of water only financial operations.

losses are projected to substantially decline over the medium term due to the construction of an expanded water reservoir (and, pipe maintenance) in the absence of aggressive leakage reduction investment.

## **V.2 Cost Structure Analysis**

Aside from labor, Komunalac's other operating costs appear to be in line with prevailing Croatia water utility cost structures with electric energy, fuel and gross salaries amounting to 4%, 3% and 50%, respectively, of total operating costs in 2002. More importantly, the existing company cost structures suffers from the high level of its costs that are fixed (e.g., labor and other expenditures). The prevalence of these fixed costs as a portion of total costs clearly indicates that the company's financial difficulties will only be met through a combination of efficiency improvements to limit and/or lower these fixed costs and sharp increase in revenues. Likewise, reduction in the current level of technical losses could contribute significantly towards restoring the company's financial equilibrium since we estimate that 13% of its total costs, or about HRK 409,000, are linked to the amount of water it uses and we know that currently only 20% of these costs generate any revenues (i.e.; technical losses of 80%).

If Komunala's technical losses were reduced to more normal level of 25%, assuming a constant level of sales, this would translate into an annual cost reduction of 9.4% of its total costs. Such reduction of costs would result for the Year 2002 in a reduction of Komunalac's operating losses by HRK 299,000 or 49%. If were to include the impact on electricity consumption that any such reduction in technical losses would have (i.e.; about 65% or another HRK 120,000 – 20% of Year 2002 losses), we can easily see that the financial dividends associated with Komunalac's ability to limit the level of its technical losses would be very significant.

### ***V.2.1 Accounts Receivable(s) and Payable***

Komunalac compiles its financial accounts on a cash basis. It was difficult, therefore, to determine the level of receivables/payables. Komunalac management stated that they collect around 20 to 30% of what the company bills. This, however, implies that receivables (and, payables) are growing. Total estimated (current) accounts receivables represent now about 20 months of estimated billings. By means of comparison, in a 1996 study, the average accounts receivables in terms of months of billings of 12 Russian water utilities,

was about 4.7 months<sup>36</sup>. In addition, management does not age receivables making it difficult to determine the extent of the problem. Finally, Komunalac does not include any significant amount of extraordinary losses in its financial statements dealing with receivables that would reflect the high level of receivables (unpaid bills).

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<sup>36</sup> See *"Russian Water Loan Feasibility Assessment"*, August 1997. PADCO, Inc.

## VI. Financial Projections

### VI.1 Income Statement and Financial Ratios

The financial analysis provided follows the same approach as the economic analysis. Costs and benefits are, however, based on market prices including taxes and duties not normally included in the economic analysis.

In determining future service provider tariff levels (and, potential debt structure), we considered the service providers estimated future revenue requirements. Some of the assumptions with respect to the utility have already been outlined. Its revenues should in aggregate be sufficient to meet all incurred expenses and to ensure its financial viability. Therefore, the revenues should be sufficient to cover all operating expenses (and, potential debt service obligations).

The following financial assumptions were made in developing the financial projections.

- **Inflation/exchange rate.** Croatia's current inflation rate is hovering between 4 and 5%. However, the financial forecast was derived in real terms (absent inflation).
- **Materials, electricity, and supporting services.** The real costs of electricity will rise marginally over the forecast period. However, with a system wide loss reduction program in place these expenditure items could conceivably be reduced over the medium term.
- **Water/Wastewater production.** The overall production of water is assumed to drop somewhat in the first and second year of the forecast as a result of more focused demand management and loss reduction programs.
  - Under the base case scenario, Komunalac water loss rate would decrease from its current 70-80% percent level to around 40%. We assumed that the additional water loss reduction expenses and leakage detection equipment would be grant financed. The new equipment and maintenance would be sufficient to reduce water loss rates to 40%.
  - In scenario two, the Optimistic Case, Komunalac would be extremely aggressive and manage to reduce water theft and water losses to around 20-25%.
- **Tariff projection.** The tariff projections include an additional increase in tariff of HRK 1 for fiscal year 2004 for both household and businesses from their

current 3.15 and 4.3 levels, respectively. In fiscal year 2006, an extra HRK 1 for both households and businesses is again assumed.

- **Investments:** Any capital investment is assumed to be grant financed. Komunalac does not provide for interest on debt service to be integrated in its tariff calculation.
- **Other Assumptions:** Under both scenarios we assume that collection rates are maintained at the same level. It is clear that this meager level of collection is unsustainable.

Tables 9 and 10 below, illustrate pro-forma income statement forecasts and financial ratios. Given the abovementioned assumptions, under the Base Case (water loss rates approach 40%) Komunalac's financial position would improve. However, Komunalac would run deficits throughout the projected period. Under the Optimistic Case (water loss rates reduced to 25%) Komunalac's financial position would improve, yet it would continue to lose money.

Our sensitivity analysis shows that at the current low level of collection rate (i.e., 20-30%) the break even level of household water consumption tariff would be about HRK 20/m<sup>3</sup> and HRK 21/m<sup>3</sup> for business. These numbers would decrease to, respectively, HRK6 and HRK 7 if Komunalac's collection rate were as expected 90 to 95%. Such difference in breakeven tariff level clearly outlines the importance for Komunalac to rapidly address its collection issues if it is to ever restore financial equilibrium.

**Table 9: Komunalac d.o.o. Projected Income Statement – In HRK Constant 2002 – Base Case**

INCOME STATEMENT	2001	2002	2003	2004	2005	2006	2007
<u>Revenues</u>							
Household Water	401,401.35	401,401.35	403,572.30	407,608.03	411,684.11	415,800.95	419,958.96
Business Water	128,651.70	128,651.70	129,347.50	130,640.98	131,947.39	133,266.86	134,599.53
Connection Fees	66,381.00	67,988.16	71,820.16	76,553.11	81,597.96	84,913.15	86,611.41
Solid Waste	546,301.00	559,527.54	584,706.28	611,018.06	638,513.88	651,474.10	651,474.10
All Other Revenues	911,089.00	933,147.46	975,139.09	1,019,020.35	1,064,876.27	1,086,490.58	1,086,490.58
Sewerage & Grants	<u>1,007,198.00</u>	<u>156,704.30</u>	<u>428,120.23</u>	<u>447,385.65</u>	<u>467,518.00</u>	<u>477,007.44</u>	<u>477,007.44</u>
<u>Total Sales</u>	<u>3,061,022.05</u>	<u>2,247,420.50</u>	<u>2,592,705.57</u>	<u>2,692,226.17</u>	<u>2,796,137.59</u>	<u>2,848,953.08</u>	<u>2,856,142.02</u>
<u>Expenses (except Depreciation)</u>							
Maintenance Equipment	126,870.00	129,941.66	135,789.04	141,899.54	148,285.02	151,294.83	151,294.83
Electricity	113,414.00	116,159.88	121,387.07	126,849.49	132,557.72	135,248.30	135,248.30
Fuel	77,710.00	79,591.44	83,173.06	86,915.85	90,827.06	92,670.62	92,670.62
Salaries	1,727,485.00	1,769,309.29	1,848,928.21	1,932,129.98	2,019,075.83	2,060,057.99	2,060,057.99
Other Expenses	1,652,127.00	1,692,126.79	1,768,272.50	1,847,844.76	1,930,997.77	1,970,192.18	1,970,192.18
<u>Total Overheads (except Depreciation)</u>	<u>3,697,606.00</u>	<u>3,787,129.07</u>	<u>3,957,549.87</u>	<u>4,135,639.62</u>	<u>4,321,743.40</u>	<u>4,409,463.93</u>	<u>4,409,463.93</u>
<u>Depreciation and Amortization</u>							
Buildings / Other	873,901.35	873,901.35	873,901.35	873,901.35	873,901.35	873,901.35	873,901.35
<u>Total Depreciation and Amortization</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>
<u>Cost of Goods Sold</u>	<u>4,923,243.41</u>	<u>5,012,766.47</u>	<u>5,185,089.62</u>	<u>5,228,876.19</u>	<u>5,417,173.32</u>	<u>5,507,109.14</u>	<u>5,509,346.58</u>
<u>GROSS PROFIT</u>	<u>-1,862,221.36</u>	<u>-2,765,345.97</u>	<u>-2,592,384.05</u>	<u>-2,536,650.02</u>	<u>-2,621,035.73</u>	<u>-2,658,156.06</u>	<u>-2,653,204.56</u>

Booz Allen Hamilton, 2003



**Table 10: Komunalac d.o.o. Projected Income Statement – In HRK Constant 2002 – Optimistic Case**

INCOME STATEMENT	2001	2002	2003	2004	2005	2006	2007
<u>Revenues</u>							
Household Water	401,401.35	401,401.35	403,572.30	537,007.40	542,377.47	679,801.55	686,599.56
Business Water	128,651.70	128,651.70	159,428.32	161,022.60	193,318.27	195,251.45	228,506.18
Connection Fees	66,381.00	66,381.00	67,097.95	68,439.91	69,808.71	71,204.88	72,628.98
Solid Waste	546,301.00	546,301.00	546,301.00	546,301.00	546,301.00	546,301.00	546,301.00
All Other Revenues	911,089.00	911,089.00	911,089.00	911,089.00	911,089.00	911,089.00	911,089.00
Sewerage & Grants	<u>1,007,198.00</u>	<u>153,000.00</u>	<u>400,000.00</u>	<u>400,000.00</u>	<u>400,000.00</u>	<u>400,000.00</u>	<u>400,000.00</u>
<u>Total Sales</u>	<u>3,061,022.05</u>	<u>2,206,824.05</u>	<u>2,487,488.57</u>	<u>2,623,859.91</u>	<u>2,662,894.45</u>	<u>2,803,647.88</u>	<u>2,845,124.72</u>
<u>Expenses (except Depreciation)</u>							
Maintenance Equipment	126,870.00	126,870.00	126,870.00	126,870.00	126,870.00	126,870.00	126,870.00
Electricity	113,414.00	113,414.00	113,414.00	113,414.00	113,414.00	113,414.00	113,414.00
Fuel	77,710.00	77,710.00	77,710.00	77,710.00	77,710.00	77,710.00	77,710.00
Salaries	1,727,485.00	1,727,485.00	1,727,485.00	1,727,485.00	1,727,485.00	1,727,485.00	1,727,485.00
Other Expenses	1,652,127.00	1,652,127.00	1,652,127.00	1,652,127.00	1,652,127.00	1,652,127.00	1,652,127.00
<u>Total Overheads (except Depreciation)</u>	<u>3,697,606.00</u>	<u>3,697,606.00</u>	<u>3,697,606.00</u>	<u>3,697,606.00</u>	<u>3,697,606.00</u>	<u>3,697,606.00</u>	<u>3,697,606.00</u>
<u>Depreciation and Amortization</u>							
Buildings / Other	873,901.35	873,901.35	873,901.35	873,901.35	873,901.35	873,901.35	873,901.35
<u>Total Depreciation and Amortization</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>	<u>873,901.35</u>
<u>Cost of Goods Sold</u>	<u>4,923,243.41</u>	<u>4,923,243.41</u>	<u>4,910,450.52</u>	<u>4,695,285.69</u>	<u>4,696,523.47</u>	<u>4,697,773.63</u>	<u>4,699,036.30</u>
<u>GROSS PROFIT</u>	<u>-1,862,221.36</u>	<u>-2,716,419.36</u>	<u>-2,422,961.95</u>	<u>-2,071,425.78</u>	<u>-2,033,629.02</u>	<u>-1,894,125.75</u>	<u>-1,853,911.57</u>

Booz Allen Hamilton, 2003

## VII. Options for Private Sector Participation

In recent years, governments throughout the world have been turning with increasing frequency to the private sector for help in developing and delivering water and wastewater services. For governments facing growing demands for service, chronic operational and institutional deficiencies, and limited fiscal resources, the private sector is increasingly being recognized as a valuable source of new technology, management expertise, and investment capital. International experience demonstrates that, if properly designed, PSP arrangements can bring dramatic improvements in the quality, availability, and cost-effectiveness of water and wastewater services.

Most literature on PSP identifies five (5) options for implementing PSP projects in the water and wastewater sector<sup>37</sup>. They are:

- Service Contracts
- Management Contracts
- Leases
- Build-Operate-Transfer Contracts and Variants
- Concessions

While these are considered to be the main options, it is important to note that in practice, PSP arrangements are often hybrids of these models. For example, management contracts sometimes include capital investment obligations and revenue-sharing provisions common to lease agreements, and leases sometimes transfer responsibility for small-scale investment, rehabilitation, or renewal to the private sector, as is characteristic of concessions. The following sections present a brief overview of the models for PSP, cite examples of where these models are in use, and suggest some lessons drawn from international experience in the use of each option.

### VII.1 Service Contracts

Service contracts are legally binding arrangements between a properly empowered government authority and a private sector contractor to perform specific, usually non-core tasks of the utility, such as meter reading and installation, operations and maintenance, information technology service design and delivery, billing and tariff collection, equipment maintenance, janitorial services, or security services, in exchange for a fee. These contracts are typically competitively bid, and are for short periods of six months to two years, after

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<sup>37</sup> Although divestiture is a common means through which to privatize an enterprise, it is not commonly used in the water sector due to the social and political sensitivity of water as a strategic national resource. As a result, we have not discussed divestiture in any detail.

which they are re-bid. The responsibility for general control and supervision of the utility, as well as any capital investment in the system, remains with the public authority.

While service contracts require only a limited degree of PSP, they nonetheless provide opportunities for the introduction of competition and private sector expertise, and free the utility up to focus on its core business. Because the contract period is short, contractors are subjected to frequent competition, which encourages efficient performance and reduces the cost of the contracts. In large urban areas, different firms can be contracted in separate geographical areas to deliver the same services. Multiple contracts ensure adequate competition and enable the water authority to compare costs and performance on an ongoing basis. Service contracting can be an attractive form of PSP where there is strong political or community opposition to wider involvement of the private sector, opposition to water tariff increases, or where the utility is seeking to shed responsibility for non-core functions. Service contracts can also be used in combination with other, deeper forms of PSP.

Despite the potential long-term benefits to the population as a whole, the introduction of service contracting sometimes has a short-term negative impact on those employees working in the operations being contracted out who may be made redundant. Governments have addressed this dilemma by providing support to those employees in forming and financing private companies to compete for the service contract, or by providing retraining and severance to support employees in finding work in other professions.

Service contracts are used widely throughout the world. For example, the water utility in Santiago de Chile has contracted out services accounting for about half its operating budget, including computer services, engineering consulting services, and repair, maintenance, and rehabilitation of the network. To enhance competition, the Santiago utility has at least two service contracts for each kind of task. These contracts are re-bid every two years in order to maximize price competition.

## **VII.2 Management Contracts**

Management contracts transfer responsibility for the operation and maintenance of government-owned utilities to the private sector. Under such contracts, ownership of the water utility and responsibility for service provision remain with the government. Likewise, the bulk of the commercial risk and all the capital and investment risks remain with the public authority. Management control and authority, however, is transferred to a private operator, which applies its expertise to improve management systems and practices. Management contracts are generally three to five years in duration.

Compensation may be in the form of a fixed fee, as in the case of a fixed fee management contract, or it may be linked to performance indicators, as in the case of a performance-based management contract.

Under a standard Fixed Fee Management Contract, remuneration to the private sector contractor is based solely on the payment of a fixed fee in exchange for the provision of specialized personnel who oversee the management of the system.

More sophisticated Performance-Based Management Contracts provide for the introduction of greater incentives for efficiency by defining performance targets or contract milestones and basing remuneration, at least in part, on their fulfillment. One variant of this model provides for a profit sharing incentive, in which the operator's remuneration is a combination of a fixed fee plus a share in the profits of the utility. Both the performance-based management contract and the profit sharing variant are effective tools for ensuring that operating and commercial risks are shared by the management contractor. However, under both models, the public authority still bears the financial risk associated with its responsibility for capital investment.

Performance-based management contracting provides the management contractor with incentives to improve operating efficiency and achieve timely compliance with the performance milestones in its contract. An advantage to these contractual models is the ability to create incentives for the contractor to tackle issues (such as staff development) that are not revenue generating in the short term, but that may establish a foundation for more efficient and sustainable performance over the long term.

Management contracts are most beneficial where the main objective is to rapidly enhance a utility's technical capacity and its efficiency in performing specific tasks, or to prepare for a deeper level of PSP. They are also attractive when there is strong political or public resistance to water tariff increases, where there is concern about handing over control of investments to the private sector, or where there is too little information and data on which to base a longer-term arrangement such as a lease or concession.

Management contracts provide little potential for expanded service coverage because they do not require the private operator to make any capital investments. As a result, they are not recommended if a government has as one of its main objectives accessing private finance for new investments.

The performance-based management contract is the most common management contract model in use around the world today. Some recent examples include:

- The Government of Venezuela awarded a performance-based contract to a Spanish firm in 1997 in order to improve cash flow, creditworthiness, and service in the water sector in Monagas State.
- In Gaza, Palestine, a performance-based management contract was awarded to a private consortium with the goals of increasing the quantity of available water by improving the efficiency of operations and distribution; by improving the quality of the water supply and of wastewater effluent; by improving management through better operations, revenue collections, and customer service; and by strengthening utility institutions through long-term planning and training.
- The Government of Jordan awarded a management contract with a profit sharing incentive aimed at addressing chronic operational, management, and financial deficiencies characterized by high levels of unaccounted-for water, rapidly increasing incremental costs of water, poor financial performance, and inadequate cost recovery mechanisms.

These experiences, and others, have shown that the incentive-based approach of performance-based management contracts is the most effective in producing positive results for both the public and the private sectors.

### **VII.3 Lease Agreement**

Under a lease, a private firm (Lessee) leases the assets of a utility from a properly empowered government authority (Lessor) and assumes the responsibility for operations, maintenance, and asset renewal for a period usually between ten and fifteen years. Typically under a lease, the tariff is used to pay the “Lessee Fee”, which remunerates the Lessee for his costs, plus a reasonable return. The remainder of the tariff goes to the government and is used to fund capital investment in system expansion, rehabilitation, and other improvements. As the Lessee’s fee is dependent upon tariff revenues, the lessee assumes much of the commercial risk of the operations.

The private operator’s remuneration is directly linked to the charges it collects from customers under a well-structured lease. From these charges, the Lessee pays the public utility a rental fee intended to cover the public utility’s capital costs for system expansion and rehabilitation. The Lessee’s profitability will therefore depend to a large degree upon how much it can reduce costs, while still meeting the quality standards set forth in the lease. Best practice leases have built-in incentives that encourage the private operators to implement efficient billing and collection procedures to improve the collection ratio from customers (including government agencies). The Lessee also has an incentive to implement aggressive policies aimed at expanding service coverage to increase the revenue base (although it is important to note that the government retains

responsibility for carrying out and financing expansion), to reduce operating costs in order to maximize profits, and to carry out regular preventative maintenance to increase the reliability and longevity of plant and equipment.

Under a lease, the public utility retains title to the assets and bears the responsibility for financing and planning capital investments and rehabilitation. It is, therefore, incumbent upon the government to raise financing and coordinate its capital investment program closely with the private contractor's operational and commercial program.

Leases are most appropriate where there is scope for large gains in operating efficiency but only limited need or scope for new investments. Leases have also sometimes been advocated as stepping-stones toward a deeper level of PSP through concessions. However, their administrative complexity and the demands they place on governments are nearly as great as those of concessions, so a lease is a much bigger first step than a management contract. Due to their complexity, leases generally require that an independent regulatory body be established to monitor and enforce the private operator's fulfillment of its obligations.

Leases have been used widely in the water sector in France and Spain, and are currently in place in Guinea, the Czech Republic, and Senegal.

#### **VII.4 Build-Operate-Transfer (BOT) Contracts and Variants**

Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), and similar arrangements are contracts specifically designed for greenfield water supply or wastewater projects or investments in water supply and/or wastewater infrastructure that require extensive rehabilitation. Under such arrangements, the private sector typically designs, constructs and operates facilities for a limited period of 15 to 30 years, after which time the contractor relinquishes all rights or title to the assets to the public utility. Under a BOO contract, the assets remain indefinitely with the private partner.

In a BOT for bulk water, the government or the distribution utility will typically pay the BOT partner for water from the project at a price calculated over the life of the contract to cover its construction and operating costs and provide a reasonable return. The contract between the private partner and the utility is usually on a "take-or-pay" basis, obligating the utility to pay for a specified quantity of water whether or not that quantity is consumed. This places all demand risk on the distribution utility. Alternatively, the distribution utility might pay a capacity charge and a consumption charge, an arrangement that shares the demand risk between the utility and the private partner.

Similar arrangements, called "offtake" agreements, are used for wastewater treatment BOTs. In this case, the government is obligated to pay the

private partner to treat a pre-defined minimum volume of wastewater, whether or not that quantity is actually delivered for treatment.

These types of arrangements have not been used extensively in the water and wastewater sector for a number of reasons. While they are attractive for new plants that require large amounts of financing, such as large water treatment plants, bulk water supply BOTs are not suitable in systems with such major problems as high unaccounted-for-water or poorly maintained water distribution systems, where the increase in supply and pressure can further exacerbate problems in the system. Another problem with BOTs is that, because water production and distribution are the responsibility of separate entities, it can be very difficult to tie increases in productive capacity with increases in demand.

While the BOT model can be a very attractive way of generating the financing needed to construct a new wastewater treatment facility, it is only viable if government is prepared to charge consumers a tariff that will fully remunerate the BOT operator for its full cost of operation, maintenance, and depreciation. In most cases, tariffs for wastewater treatment are bundled with those for water. When this is not the case, it is very difficult, if not impossible, to collect payment for services.

Effective implementation of BOT type contracts requires careful attention to the design of tender documents and can involve a relatively lengthy bidding process. Experience with some BOTs shows that they achieve some savings in capital construction costs and facilitated more rapid investment in infrastructure. However, they can be an expensive way of substituting private debt for public debt if there is a take-or-pay contract for sale of bulk water to the retail utility. Additionally, many BOTs have failed to deliver optimal outcomes for government or consumers because the government's agency responsible for negotiating allowed too much of the risk to remain with government, especially where foreign exchange guarantees were provided, or where take-or-pay contracts were signed.

BOTs and their variants have been used for water treatment in such countries as Malaysia, Australia, and for sewage treatment in Chile and New Zealand. In Zagreb, the first-ever BOT for wastewater treatment in Croatia has been initiated with funding from the EBRD.

## **VII.5 Concessions**

Under a concession, the private contractor, or Concessionaire, bears overall responsibility for the services, including operation, maintenance, and management, as well as capital investments for rehabilitation, renewal, and the expansion of services. The fixed assets either remain the property of the public authority or revert to public ownership at the end of the concession period.

Concession contracts usually have a duration of twenty to thirty years, depending on the level of investments and the period required for the Concessionaire to recover its investments plus a reasonable rate of return.

Concessions are typically awarded based on price, with the contract going to the bidder proposing to operate the utility and meet the investment targets for the lowest tariff. The concession is governed by a contract which sets out such conditions as the main performance targets for coverage and quality, performance standards, arrangements for capital investment, mechanisms for adjusting tariffs, and arrangements for dispute resolution. Penalties are imposed if the Concessionaire fails to comply with the performance targets specified in the contract.

The Concessionaire is paid for its services directly by the consumer, based on the contractually set tariff, which is adjustable over the life of the contract. The Concessionaire retains the balance of revenues after paying back any taxes and charges levied on consumers by the public authority. If expenses exceed revenues, the Concessionaire must absorb these losses. Combining the responsibility for operations and investments under a concession agreement provides the Concessionaire with an incentive to make efficient decisions regarding investment and technological innovations, because the operator will benefit directly from any efficiency improvements.

The main advantage of a concession is that it passes full responsibility for operations, maintenance, rehabilitation, renewal, and system expansion to the private sector and so creates incentives for efficiency in all the utility's activities. Therefore, concessions are an attractive option where large investments are required to expand coverage or to improve the quality of services. However, concessions are administratively complex undertakings for governments, because they confer a long-term monopoly on the concessionaire and thus require rigorous monitoring and enforcement. The quality of regulation is, therefore, important in determining the success of the concession, particularly the distribution of its benefits between the concessionaire (in profits) and consumers (in lower prices and improved service).

Concessions have a long history of use in the developed world, and are increasingly being used in developing countries such as Colombia, Argentina, Bulgaria, Romania, the Philippines, and Malaysia.



## VII.6 Summary and Implications

The following tables summarize the aspects of each option for PSP and the considerations for government when selecting an option.

**Table 11: PSP Options – Allocation of Key Responsibilities**

Option	Asset Ownership	Operations & Maintenance	Capital Investment	Commercial Risk	Duration
Service Contract	Public	Public + Private	Public	Public	1 – 2 yrs
Management Contract	Public	Private	Public	Public	3 – 5 yrs
Lease	Public	Private	Public	Shared	8 – 15 years
Concession/BOT	Public	Private	Private	Private	20 – 30 yrs

Source: Severn Trent Water International  
Booz Allen Hamilton, 2003

**Table 12: What do Governments Want and Which PSP Options Delivers?**

Type	Technical Expertise	Managerial Expertise	Operating Efficiency	Investment Efficiency	Investment in Bulk Capacity	Investment in Distribution System	Responsive to Customers	Insulation from Political Intervention
Service Contract	Y	N	N	N	N	N	N	N
Management Contract*	Y	Y	Y	N	N	N	P	P
Lease	Y	Y	Y	N	N	N	Y	Y
Concession/BOT	Y	Y	Y	Y	Y	Y	Y	Y

\* Management contract with performance incentives

**Key:** Y = Objective can be satisfied, N = Objective cannot be satisfied, P = Objective can be partially satisfied

Source: Severn Trent Water International  
Booz Allen Hamilton, 2003

**Table 13: How Much do Governments Have to Offer to Get What They Want?**

Type	Stakeholder support and political commitment	Cost recovery tariffs	Good information about the system	Developed regulatory framework	Good country financial rating
Service Contract	Unimportant	Not necessary in the short term	Possible to proceed with only limited information	Minimal monitoring capacity needed	Not necessary
Management Contract*	Low to moderate levels needed	Preferred but not necessary in the short term	Sufficient information required to set incentives	Moderate monitoring capacity needed	Not necessary
Lease	Moderate to high levels needed	Necessary	Good information system required	Strong regulatory capacity needed	Not necessary
Concession/BOT	High levels needed	Necessary	Good information system required	Strong regulatory capacity needed	Higher rating will reduce costs

\* Management contract with performance incentives

Source: Severn Trent Water International

Booz Allen Hamilton, 2003

## VIII. Private Sector Participation in Kostajnica

The following issues and challenges have a direct impact on the potential for PSP in the Kostajnica area:

- **Asset Ownership:** There is a general lack of clarity over the legal ownership of Komunalac's capital assets. Although corporate ownership of the company is vested in the municipalities of Hrvatska Kostajnica, ownership of the assets themselves has not been determined. Specifically, the issue of HV's right to ownership is a complicated one. HV has provided much of the post-war funding for capital investment and, in theory, this investment is being repaid through a debt for equity swap with the utility. However, in practice, HV is not interested in taking on ownership of Komunalac but it is coming under pressure from Croatia's State Audit Department, which would like to see it assume its share of ownership. By law, HV cannot own more than 49% of any utility and, therefore, there is not possibility that it may own a majority share. The situation is additionally complicated because there is also a law in Croatia stating that in the war-torn areas, any capital investment funds provided by HV cannot legally form the basis of future shares in the ownership of the company receiving the funds. Nonetheless, until this issue is brought to some sort of legal test, the question of ownership will remain unanswered.
- **Wastewater Treatment:** The current lack of any wastewater treatment in the Komunalac service area is posing an enormous environmental threat to the downstream users of the river Una as well as the river Sava. This environmental threat, combined with pressure from the national government to come into compliance with wastewater treatment standards in preparation for EU accession, has brought the need for investment in wastewater treatment to the forefront. However, the cost to construct a wastewater treatment facility in Kostajnica far exceeds Komunalac's financial resources.
- **Limited Potential for Tariff Increases:** As stated previously, tariff increases in the war torn areas of Croatia are still considered very controversial. In Kostajnica, the potential for tariff increases is dependent upon the political will of the City Council.
- **Regional Context:** Although Kostajnica is severely economically depressed, it is located in a politically strategic area. Because of its shared border with Bosnia (and the Republika Srpska), the GOC as well as several bi- and multi-lateral donors have committed to providing funds to support economic growth and infrastructure development in Kostajnica.

The following table sets out the options for change, including the legal and technical implications and financial attractiveness, to the various types of PSP described in the previous section. Also include, for the sake of comparison, is an option of “Doing nothing.”

Based on our analysis of the situation in the Komunalac service area, as well as our understanding of the overall legal, regulatory, economic, and political climate prevailing in Croatia, we have eliminated leases and concessions as viable PSP options in Kostajnica. Komunalac’s current financial situation, compounded by the lack of political support for the institution of a cost recovering tariff, make both options not only unviable from a financial standpoint, but unattractive to private potential private operators. From among the remaining options, we recommend that the following be explored in more detail.

### **VIII.1 Outsourcing Non-Core Functions**

During our interviews with the Director of Komunalac, he expressed an interest in outsourcing the utility functions that do not relate to the provision of water and wastewater service. These include maintenance of the produce market, as well as the entire solid waste collection, treatment and disposal function. Because analysis of these business areas was not within our scope of work, we are no position to recommend a particular form of PSP for these areas. However, we strongly encourage Komunalac to further explore these options as part of a larger strategy of unbundling Komunalac.

### **VIII.2 BOT for wastewater treatment in region**

Komunalac has already begun to explore a regional solution for wastewater treatment. During our interviews, the Director indicated that he had made preliminary inquiries into EU funding to support the development of a BOT for a greenfield wastewater treatment facility to service the needs of both Hrvatska and Bosinska Kostajnica. Regardless of whether EU funds become available, we recommend that Komunalac pursue this type of solution and explore further options for funding.

**Table 14: Options for Change**

Type of Contract	Legal Implication	Technical Implication	Financial Attractiveness	General Comment
<i>Status Quo</i>	<ul style="list-style-type: none"> <li>Company ceases to be a “going concern”</li> <li>No transfer of any legal or regulatory risk</li> <li>No legislation changes required</li> <li>Need to clarify HV share of ownership</li> </ul>	<ul style="list-style-type: none"> <li>Company lacks the resources to fund major works or investment in wastewater treatment</li> <li>Company lacks in-house skills or capacity to assume responsibility for capital investment program</li> </ul>	<ul style="list-style-type: none"> <li>No or very limited internal funding available to finance capital expenditure</li> <li>Inability to attract external private funding</li> <li>Likely that company will continue to suffer losses</li> <li>Company lacks ability to improve internal cost accounting and cost management without external assistance</li> </ul>	<ul style="list-style-type: none"> <li>Generally the company’s financial situation will continue to deteriorate</li> <li>Limited potential to improve standards of service</li> <li>Continued risk of environmental degradation due to lack of wastewater treatment</li> </ul>
Service Contract	<ul style="list-style-type: none"> <li>Limited transfer of legal and regulatory risk</li> <li>No legislation or regulatory change required</li> <li>May be legally difficult to reduce utility staff if required</li> </ul>	<ul style="list-style-type: none"> <li>Limited potential for long-term benefits.</li> </ul>	<ul style="list-style-type: none"> <li>A service contract could be awarded for billings and collections. This could have short term benefits but not likely to be long term solution</li> <li>No private sector funding</li> </ul>	<ul style="list-style-type: none"> <li>Enables the company to engage specific skills required</li> <li>The small size of Komunalac operation may limit the benefits to be gained from outsourcing</li> </ul>
Management Contract	<ul style="list-style-type: none"> <li>No legislation or regulatory change required</li> </ul>	<ul style="list-style-type: none"> <li>Can structure a performance-based arrangement with targets for UFW reduction and other technical parameters, but benefits are limited by lack of private funds for capital investment</li> <li>May help utility to improve capital planning or execution of capital expenditure program, but limited long term benefits</li> </ul>	<ul style="list-style-type: none"> <li>No private sector funding</li> <li>May increase utility’s ability to attract external private funds</li> <li>Financial improvements possible if targets are set appropriately for cost reduction and revenue enhancement</li> <li>May provide resources required to improve utility’s cost accounting systems</li> </ul>	<ul style="list-style-type: none"> <li>Workforce sometimes unwilling to take instruction from new or outside management team</li> <li>Could help to strengthen overall corporate planning</li> <li>Size of Komunalac operation may be too small to justify cost of management contract – a regional solution at the county level could be more attractive and affordable</li> </ul>

Type of Contract	Legal Implication	Technical Implication	Financial Attractiveness	General Comment
Lease	<ul style="list-style-type: none"> <li>Transfers much of the regulatory risk</li> <li>Legislative change may be required</li> <li>Need to clarify HV ownership issue</li> <li>Labor transition or redundancy issues may pose legal challenge</li> <li>Requires sophisticated regulatory capacity</li> </ul>	<ul style="list-style-type: none"> <li>The majority of capital investment responsibilities remain in the public sector's hands</li> <li>Will not provide funding for construction of greenfield wastewater treatment facility</li> </ul>	<ul style="list-style-type: none"> <li>Requires that a cost recovery tariff be charged</li> <li>Likely staff will not transfer to lessee without first payment of redundancy package</li> <li>Limited private sector funding</li> <li>Major part of commercial risk transferred to lessee</li> <li>May take time to arrange</li> </ul>	<ul style="list-style-type: none"> <li>Complicated bidding process</li> <li>Takes time to prepare contract and appoint lessee</li> <li>Doubtful whether qualified operator would be interested in contract due to small size of Komunalac operation</li> <li>No guarantee of successful award of contract</li> </ul>
Concession/BOT	<ul style="list-style-type: none"> <li>Full transfer of regulatory risk</li> <li>Significant legislative change likely required</li> <li>Must resolve issue of HV share of ownership</li> <li>Labor transition or redundancy issues may pose legal challenge</li> <li>Requires sophisticated regulatory capacity</li> </ul>	<ul style="list-style-type: none"> <li>BOT could be appropriate solution for construction of greenfield wastewater treatment facility</li> <li>Likely to greatly improve system efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Requires that a cost recovery tariff be charged</li> <li>Investment funded by private sector</li> <li>Commercial risk transferred entirely to private sector</li> <li>May take time to mobilize external funding</li> <li>Likely staff will not transfer without first payment of redundancy package</li> </ul>	<ul style="list-style-type: none"> <li>BOT could be good solution for construction of wastewater treatment, but due to small size of Komunalac operation and lack of financial resources, a regional solution is probably most appropriate</li> <li>Complicated bidding process</li> <li>Takes time to prepare contract and appoint private operator</li> <li>Doubtful whether qualified operators would be interested due to small size of Komunalac operation</li> <li>No guarantee of successful award of contract</li> </ul>

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Under such an arrangement, a private operator would finance and construct a wastewater treatment plant and would then operate the plant for a pre-determined duration before transferring ownership to a contracting authority (this could be Komunalac, the utility in Bosinska Kostajica, or some combination of both).

The private operator would remunerate itself through collection of a cost-recovering tariff<sup>38</sup> that would be agreed with individual utilities through a contractual mechanism called an “offtake agreement.” This type of contract would be required between the private operator and every utility from which the operator accepts wastewater to be treated. It would establish the terms of the relationship, defines effluent and treatment standards, and sets the volumetric price at which the BOT operator will accept untreated wastewater from the utilities. Such offtake agreements would be in addition to the actual BOT arrangement between the operator and the primary contracting party to whom ownership of the newly-constructed assets would transfer at the conclusion of the contract.

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<sup>38</sup> The tariff must be “cost recovering” in order to provide the operator with sufficient remuneration to cover the cost of operations, maintenance, and depreciation, as well as a reasonable return.

## **IX. Next Steps**

Table 15 presents a brief action plan for Komunalac. It is a non-exclusive list of suggestions that the utility should undertake. Komunalac and the municipality already have achieved some of these suggested actions. However, it may be appropriate for Komunalac to develop or enhance some of its current practices with simple changes, such as including an automatic inflation escalator in its current tariff structure.



**Table 15: RAD d.o.o Drnis – Suggested Water and Sewer Enterprise Action Plan**

	Action Items	Description
I. Corporate Reorganization	<b>Define Service Provider Assets</b>	<p>The water utility should, in conjunction with the local municipality, develop or revise its current service agreement with the municipality, by issuing:</p> <ul style="list-style-type: none"> <li>• A broad statement of the intended use of the assets;</li> <li>• A complete inventory of the assets and a description and other documentation of their physical condition and depreciable value.</li> <li>• The utility should periodically revalue the transferred assets for purposes of depreciation, disposition and balance sheet adjustments in accordance with applicable law, and corresponding amendments to the property transfer agreement to reflect these revaluations.</li> <li>• Periodic amendments to the inventory of the assets transferred to reflect dispositions and acquisitions. In addition, the question of HV's ownership of assets must be resolved. In addition, the question of HV's ownership of assets must be resolved.</li> </ul>
	<b>Review and Conclude Service Agreement Between the Utility and City Administration</b>	<ul style="list-style-type: none"> <li>• The local administration and the utility already have a modest service agreement in place, but this service agreement should be reviewed in light of the utility's requirements for additional capital spending for leakage reduction etc.</li> <li>• The service agreement should project tariff and service levels for three to five years, but should be subject to periodic (perhaps annual) review and revision by mutual agreement. The service agreement should include the following major elements: <ul style="list-style-type: none"> <li>o A statement of the purposes of the agreement;</li> <li>o A general statement of the rights and obligations of the utility, including the rights to set its own operating, management, personnel, and other business policies; to take all reasonable and necessary steps to bill and collect tariffs from customers; to deliver services at a level consistent with revenues, and the obligations to operate as a financially-sustainable enterprise, to take all actions reasonably required to enable it to deliver the agreed level of services, and to resolve all disputes regarding non-compliance with the service agreement in proceedings before the local independent regulatory body;</li> <li>o A general statement of the rights and obligations of the Administration, including the right to monitor compliance with the service agreement, and the obligations to permit the Enterprise to exercise its rights and fulfill its obligations without inappropriate political influence or interference by the Administration, to support a level of tariffs appropriate to the agreed level of service.</li> <li>o Statements of long-term and short-term goals for water and wastewater service levels, including objective measures and specific schedules. Such goals could include improved water supply service duration and pressures, reduced water supply system leakage, improved water and wastewater system maintenance, reduced energy use, and improved water and effluent quality;</li> <li>o A requirement for the utility to prepare and execute a capital repair and capital investment plan, in coordination with the City's overall plan for social and economic development;</li> <li>o A requirement for the utility to develop and undertake (and for the Municipal Administration to support) a program of customer education and improved customer relations;</li> <li>o Requirements for improved accounting by the utility and for period audits and publication of its financial results;</li> <li>o Requirements for periodic reporting by the Administration and by the utility on performance (or non-performance) of their respective obligations under the service agreement;</li> <li>o Statements of any conditions of the Administration's or the Utility's obligations, including availability of funding for required capital repairs and capital investments, absence of material adverse changes in law, and absence of <i>force majeure</i>;</li> <li>o A statement that the service levels called for by the agreement will be periodically reviewed and revised by mutual agreement; and</li> <li>o A general statement of intent by the Administration and the Enterprise to cooperate with one another, use their best efforts to fulfill their respective obligations and to allow the other party to exercise its rights under the service agreement.</li> </ul> </li> </ul>

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**Table 15 (cont'd): RAD d.o.o Drnis – Suggested Water and Sewer Enterprise Action Plan**

	Action Items	Description
<b>II. Regulatory Issues</b>	<b><i>Include Water and Wastewater Regulation in the Existing Energy Regulatory Commission's Responsibilities</i></b>	<p>Although the responsibility for tariff regulation currently resides at the municipal level, there has been no attempt to regularize the procedures or criterion for tariff adjustment. The result has been undue political interference in the tariff setting process and a lack of political willingness to increase tariffs to a level that even approaches cost recovery. One possible solution would be to expand the scope of the current, national-level energy regulatory commission to include the regulation of water tariffs, with the following terms and conditions:</p> <ul style="list-style-type: none"> <li>• All decisions of the regulatory body regarding new tariffs will be made only after a public hearing (preceded by publication of adequate prior written notice of the hearing), at which all interested parties will have the right to be heard and to present relevant evidence;</li> <li>• All decisions of the regulatory body will be in writing, stating the evidence presented and the reasons for its decision;</li> <li>• All decisions of the regulatory body will be published in the local mass media and will be available to all interested parties at no cost (copies to be provided at actual cost);</li> <li>• So long as the regulatory body acts within its jurisdiction, according to the procedures described in the Charter and according to applicable law, the City Administration will not interfere with its operations.</li> </ul>
	<b><i>Establish Automatic Inflation Escalator Mechanism In Tariffs</i></b>	The tariff approval process should include an indexed inflation escalator mechanism. This mechanism would allow the utility to adjust water and wastewater tariffs on their own, without further approval of the tariff regulator, to reflect inflationary increases in the cost of major inputs, especially energy costs, according to inflation indices issued periodically (e.g., quarterly) by the appropriate government agency.
<b>III. Management Improvements</b>	<b><i>Increase Emphasis on Financial Reporting and Accountability</i></b>	Monthly reports should include Trial Balance, Monthly Cash Flow, and Profit and Loss statements. All financial statements should have columns comparing forecast versus actual (not adjusted for revenues received). Accounts receivable should be analyzed (bad debt expense) on a monthly basis. The utility should annually undergo an external audit. Further, the utility should begin the process of allocating its costs among its various cost centers.
	<b><i>Implement an Efficient Cost Accounting System</i></b>	The Accounting Department has a less than fully effective cost accounting system in place. Installing a consolidated cost accounting computer program will greatly enhance the productivity of numerous operations. In addition, the utility manager will be able to more fully understand the utility's production costs. In addition, the utility manager will be able to more fully understand the utility product costs.
	<b><i>Revalue Assets</i></b>	The utility should consider reviewing whether it needs to hire a professional valuation expert who would conduct an on-site physical valuation. Based on the results of such an exercise, the utility should include the calculated revalued depreciation in its tariff. Currently, the tariff structure includes a depreciation value that may not accurately reflect the actual value of the utility's assets.

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**Table 15 (cont'd): RAD d.o.o Drnis – Suggested Water and Sewer Enterprise Action Plan**

	<b>Action Items</b>	<b>Description</b>
<b>IV. Operational Efficiency Issues</b>	<b>Reduce Production Inefficiencies</b>	The utility should compare current actual production with factory-designed nameplate capacity and develop a production efficiency program that will be included in the new service agreement with the Administration.
	<b>Reduce Delivery Losses</b>	The utility should determine the magnitude of delivery losses and develop a loss reduction program that will be included in the new service agreement with the Administration as well as capital improvement planning.
	<b>Streamline the Enterprise Employment</b>	The utility management should evaluate total staff requirements to determine if possible staff redundancies and production inefficiencies exist. Where possible, management should reduce staffing requirements through transfers and attrition.
<b>V. PSP</b>	<b>Outsourcing of Non-Core Functions</b>	The Utility should explore the options for PSP in produce market maintenance, as well as solid waste as part of a larger strategy to horizontally unbundled Komunala and contract out those functions not directly related to the provision of water and wastewater services.
	<b>Regional BOT for Wastewater Treatment</b>	The utility should continue discussions with Bosinska Kostajnica and initiate a dialogue with other services providers in the county about arranging a BOT for the construction of a greenfield wastewater treatment facility. Komunala has already contacted the EU about funding for such an arrangement, but should also explore other bi- and multi-lateral sources of funding.

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## Annex A: List of Persons Consulted / Contacted

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## Annex B: Benchmarking Indicators - Definitions

This section provides a brief discussion of water / wastewater indicators and their definition. These are commonly used indicators and definitions and are periodically used in the financial, institutional and engineering review.<sup>39</sup>

### *Coverage*

INDICATOR	UNIT	CONCEPT
Water Coverage	%	Population with easy access to water services (either with direct service connection or within 200m of a standpost)/total population under utility's nominal responsibility, expressed in percentage.
Sewerage Coverage	%	Population with sewerage services (direct service connection)/total population under utility's notional responsibility, expressed in percentage.

Coverage is a key development indicator. Both coverage indicators are impacted by currency of census data. The need to estimate populations served by stand posts will affect the confidence that can be placed in the water coverage measure. Coverage provides insights into the extent of the infrastructure provided but not aspects of quality of service.

### *Water Consumption and Production*

INDICATOR	UNIT	CONCEPT
Water Production	lpcd m3/conn/m m3/hh <sup>1</sup> /m	Total annual water supplied to the distribution system (including purchased water, if any) expressed by population served per day; by connection per month and by household per month.
Water Consumption	lpcd m3/conn/m m3/hh <sup>1</sup> /m	Total annual water sold expressed by population served per day; by connection per month and by household per month

<sup>39</sup> The indicators and definitions are predominately taken from "Russia Water Loan Feasibility Assessment: Overview" Prepared for United States Agency For International Development, Contract No. CCS-0008-C-00-2057-00, Task Order 87. by Alexander Gamota, Michael Schaeffer, Samuel Coxson, Ernie Slingsby et al. In addition, several definitions were obtained from The Benchmarking Startup Kit, World Bank, 2003 obtained from the following website addresses: [http://www.worldbank.org/html/fpd/water/topics/bench\\_networkutility.html#English](http://www.worldbank.org/html/fpd/water/topics/bench_networkutility.html#English) and, [http://www.worldbank.org/html/fpd/water/topics/bench\\_network.html](http://www.worldbank.org/html/fpd/water/topics/bench_network.html).

INDICATOR	UNIT	CONCEPT
Metered Water Consumption	lpcd m <sup>3</sup> /conn/m m <sup>3</sup> /hh <sup>1</sup> /m	Total annual metered water consumed expressed by metered population served per day; by metered connection per month and by metered household per month.

Note 1: household.

Theoretically the “best” water consumption indicator is expressed in terms of liters per connection per day (lpcd). However there are data problems, including:

- Lack of accurate total consumption data (for example from universal metering)
- Poor quality, or out of date, census data

While the accuracy of service populations may need improvement, utilities are often more confident in the number of connections in their system, and the number of households they supply. In addition water production figures may be known more reliably than those for water consumption. To draw on these or other sources of (potentially) more reliable data a number of indicators have been included. These will allow trending analyses to be undertaken within a utility. Inter utility comparisons will be more difficult, however, given the different mix of household sizes and dwellings served by one connection. This is especially the case between utilities in different countries. Homogeneity of household size, and dwellings per connection, within a country will allow informed in-country comparisons to be made.

### *Unaccounted for Water (UFW)*

INDICATOR	UNIT	CONCEPT
Unaccounted-for-Water (UFW)	% m <sup>3</sup> /km/d m <sup>3</sup> /conn/d	Difference between water supplied and water sold expressed as a percentage of net water supplied; as volume of water “lost” per km of water distribution network per day; and volume of water “lost” per water connection per day.

Unaccounted for water represents water that has been produced and is “lost” before it reaches the customer (either through leaks, through theft, or through legal but non monitored usage). Part of this unaccounted for water can be saved by appropriate technical and managerial actions. It can then be used to meet currently unsatisfied demand (and hence increase revenues to the utility),

or to defer future capital expenditures to provide additional supply (and hence reduce costs to the utility). There is a debate as to the most appropriate measure of unaccounted for water. A percentage approach can make utilities with high levels of consumption, or compact networks, look to be better performing than those with low levels of consumption or extensive networks. To capture these different perspectives the reporting of three measures of unaccounted for water has become the norm.

### *Metering Practices*

INDICATOR	UNIT	CONCEPT
Proportion of connections that are metered	%	Total number of connections with operating meter/ total number of connections, expressed in percentage
Proportion of water sold that is metered	%	Volume of water sold that is metered/ Total volume of water sold, expressed in percentage

Metering of customers is considered good practice. It allows customers the opportunity to influence their water bills, and provides utilities with tools and information to allow them to better manage their systems. The indicators provide two separate perspectives on the issue, both of which are relevant in their own right. Taken together the indicators provide insights into the effectiveness of a metering installation strategy (the ratio proportion of water sold that is metered divided by the proportion of connections that are metered indicates the extent to which a utility is targeting large water users as the highest priority).

### *Pipe Network Performance*

INDICATOR	UNIT	CONCEPT
Pipe Breaks	breaks/km/yr. breaks/conn/yr.	Total number of pipe breaks per year expressed per km of the water distribution network; and per number of water connections
Sewerage Blockages	blockages/km/yr. blockages/conn/yr.	Total number of blockages per year expressed per km of sewers; and per number of sewerage connections.

The number of pipe breaks, relative to the scale of the system, is a measure of the ability of the pipe network to provide a service to customers. The length of the network and the number of connections can normalize the number of breaks. The rate of water pipe breaks can also be seen as a surrogate for the general state of the network, although it reflects operation and maintenance practices too. It must be recognized, however, that highly aggregated reporting can hide the fact

that sections of the network may be perpetually failing, whilst much of the remainder is in reasonable condition. Sewer blockages are, likewise, a measure of the ability of the sewer network to provide a service to customers. Blockages can reflect a number of issues including the effectiveness of routine operations and maintenance activities, the hydraulic performance of the network, and the general condition of the pipes.

### *Cost and Staffing*

INDICATOR	UNIT	CONCEPT
Unit Operational Cost	US\$/m3 sold  US\$/m3 produced	Total annual operational expenses <sup>1</sup> /Total annual volume sold.  Total annual operational expenses <sup>1</sup> /Total annual water produced.
Staff/'000 Water connection Staff/'000 W&S connection Staff/'000 water pop served Staff/'000 W&S pop served	# # # #	Total number of staff expressed as per thousand water connections; per thousand water and sewerage connections; per '000 water service population and per '000 water and sewerage service populations.
Labor Costs as a proportion of Operational Costs	%	Total annual labor costs (including benefits) expressed as a percentage of total annual operational costs.
Contracted-out service costs as a proportion of operational costs	%	Total cost of services contracted-out to the private sector expressed as a percentage of total annual operational <sup>1</sup> costs.

Unit operational costs provide a “bottom line” assessment of the mix of resources used to achieve the outputs required. The preferred denominator related to operational costs is the amount of water sold. This ratio then reflects the cost of providing water at the customer take off point.

Lack of universal metering, doubtful accuracy of many household meters, and a focus in the past on water production, mean that an alternative measure of operational cost per cubic meter of water produced is also relevant in the short term. Staff costs are traditionally a major component of operating costs. Understanding staffing levels can often give a quick guide to the extent of overstaffing in a water utility. While preferable to allocate staff to either water or sewer services, this information is often not available. The staff ratios therefore use both the number of water connections, and the total number of water and sewer connections as denominators.

Comparisons are best made between utilities that offer the same scope of service both in terms of total size, and mix of water and sewer service. Note that with increasing use of outside contractors the emphasis on staff numbers will



become less relevant. The number of people served per connection varies from country to country depending on the housing stock and different approaches to service connections. To facilitate international comparisons a denominator of populations served has also been included. Utilities are frequently over staffed and this measure provides insights into the impact of possible changes in future staff numbers.

### *Quality of Service*

INDICATOR	UNIT	CONCEPT
Continuity of Service	Hrs/day	Average hours of service per day for water supply.
Complaints about W&S services	% W&S connection	Total number of W&S complaints per year expressed as a percentage of the total number of W&S connections
Wastewater treatment	%	Proportion of collected sewage that is treated by at least primary treatment (including screening).

Historically there has been limited attention paid to measures that capture the quality of service provided to customers. This, in fact, should be a particular focus of performance measurement, especially with the emphasis currently being placed on the use of output measures to monitor service provision. The measures presented above are a limited first step in the process of capturing information on quality of service. Complaints, while relatively easy to track, give only a glimpse of actual company performance - consumers may have become accustomed to poor service and do not complain. In other instances there are poor, or non-existent, mechanisms in place to report complaints. Capturing at least some customer-derived data, however, is considered an important starting point.

Collection of wastewater does not mean that the waste is fully treated before discharge back to the environment. This indicator will provide an understanding of the amount of effluent that is discharged without any material treatment by the utility. A more comprehensive set of quality of service indicators could be developed but the likelihood of the data being collected by utility managers is limited in the short term. Expansion of the set is therefore a medium to long-term objective.

### *Billings and Collections*

INDICATOR	UNIT	CONCEPT
Average Tariff Water and Sewerage	US\$/m3/yr. US\$/connection/yr. US\$/hh/yr.	Total annual operating revenues (W&S) expressed by annual amount of water sold; by number of connections and by households served.
Total Revenues per population served/GDP	%	Total annual operating revenues per population served/National GDP per capita; expressed in percentage
Residential fixed charge	US\$/connection/yr. %	Any fixed component of the residential tariff (total amount) and as a proportion of the average tariff per connection per year.
Ratio of industrial to residential charges	%	The average charge (per m3) to industrial customers compared against the average charge (per m3) to residential customers.
Connection charge	US\$ and % GDP - water US\$ and % GDP- sewage	The cost to make a residential pipe connection to the water system and the sewer system measured in absolute amount and as a proportion of national GDP per capita.
Collection Period	Months	Year-end accounts receivable/Total annual operating revenues expressed in months equivalent of sales.

What people pay for water and sewer services is important. As in other indicators, unreliable consumption information necessitates the use of multiple measures for average tariff (i.e. per cubic meter, per connection, and per household). High tariffs may reflect the degree to which sewer services are provided. The average tariff used in this indicator does not explicitly account for different services provided and any inter utility comparisons should take this into account.

Average tariffs need to be put in the perspective of affordability. Income data, however, is not easy to obtain. The indicator selected here, therefore, compares average per capita tariffs as a proportion of per capita GDP. GDP will be for a whole country, and not reflect local variations, but is considered adequate for the broad comparisons to be made at the current time. Inter country comparisons will be hindered by the variable relationship that exists between GDP and income, but the trend for this ratio within a country will provide insights into changes in the relative cost of water.

Some utilities use fixed charge components within the residential tariff (i.e. irrespective of the amount of water consumed). Such tariffs can adversely affect low volume water consumers. They also protect the revenue stream to the utility in periods when consumption is highly variable. Comparison of the fixed

component with the average tariff will give an indication of the relative weight of the fixed and variable component of a water bill.

There may be a cross subsidy between industrial consumers and residential consumers. The ratio of the average charges (per m<sup>3</sup>) to industrial and residential customers provides some quantification of this subsidy. Subsidies are complex and this ratio provides only a simplistic assessment of the situation in any utility.

Paying for the service is an on going expense. For many, the cost of connecting to the pipe network can be a significant financial hurdle. Comparing connection charges will provide insights onto the level to which this hurdle has been raised. It is a particular issue when seeking to connect poorer sections of the community. The indicator provides the absolute level and as a proportion of national GDP per capita.

Billing customers, and getting paid are two different things. The effectiveness of the collections process is measured by the amount of outstanding revenues at year-end compared to the total billed revenue for the year. This is expressed in month equivalents.

### *Financial Performance*

INDICATOR	UNIT	CONCEPT
Working Ratio	#	Total annual operational expenses/Total annual operating revenues
Debt Service Ratio	% Operating Revenues	Total annual debt service expressed as a percentage of total annual operating revenues.

These indicators have been selected from a much larger range of financial indicators (which include other leverage, liquidity, profitability and efficiency ratios). They help answer two important questions:

- Do revenues exceed operating costs? And,
- What is the fixed hurdle of debt repayment as a proportion of utility revenue?

### *Capital Investment*

INDICATOR	UNIT	CONCEPT
Investments	% Operating Revenues US\$/c.	Total annual investments expressed as a percentage of total annual operating revenues; and per (water) capita served.
Net Fixed Assets/capita	US\$/c	Total annual net fixed assets per (water) capita served.

Investment will fluctuate from year to year and the indicators selected will reflect this variation. An inter utility comparison in any one year will likely have a great range of values. Over time, however, rolling average indicators can be calculated that will allow an impression of the steady state level of investment to be observed. The capital intensity of the utility is captured by the net fixed assets-per-capita served indicator. Unfortunately there is often limited information available about asset values and until more emphasis is placed on this item the values derived must be treated with caution.

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